The Builder.

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Roman Building in England and in Italy.

AN interesting description of the masonry of the portion of Roman wall lately discovered in the excavation for the Fenchurch-street Railway Station has been sent to the daily papers by the engineer of the Great Eastern Railway. The top of the portion discovered was about 9 ft. below the surface, and the bottom 9 ft. lower, giving a total of 18 ft., which very fairly corresponds to what we have before had occasion to mention as a rough scale for the accumulation of *débris* on town-sites, of about 1 ft. per hundred years. There are, however, several particulars of an unusually suggestive nature with regard to this wall. We need only slightly refer to its ponderous strength,—9 ft. in thickness at its foundations,—a strength which, before the invention of gunpowder, was enough to guarantee a long resistance to even a pertinacious attack.

But it was not on mass alone that the Roman builder depended for security. When we consider the details of the present portion of his structure, we shall see how much thought has been given to the production of stable and durable work. Of the character of the cement used we shall have a word or two to say, only now remarking that after a lapse of more than 1500 years the solidity of the work is such as to render its demolition,—even when attempted course by course,—a very serious affair. The courses of wall are, in the main, 6 in. courses of random rubble, in limestone and mortar. But the thickening of the wall, not being effected by batter, but by steps, involved the introduction of a material that would afford a more level surface than rubble for the offsets,—if we rightly understand Mr. Langley's expression, "projecting three inches." This material is afforded by what the account calls tiles, but which are really the Roman bricks, frequently found in ancient work in this country, and made and used to this day in Italy. These bricks are 17 in. long, 12 in. broad, and 1½ in. thick.

There can be no doubt that the Roman bricks were introduced in order to form plinths or level offsets, as three offsets on each side of the wall are thus finished. The value of the long flat form for bond is also to be remarked. The two upper layers, of three courses each, extended through the wall. The lowest layer, 18 in. above the foundation, was probably not far from the level of the soil. This course only extended 18 in. into the wall; the rubble being built on two layers of blocks of stone, each 9 in. deep, and about 2 ft. square. It will be very interesting to ascertain from what quarries the Romans brought the limestone to build the wall of London; and Mr. Langley will do good service to archæology, as well as to the kindred professions of the architect and of the engineer, if he will obtain an accurate analysis of the stone found, and aid in determining whence it was brought.

Under the stonework of the wall was a bed, composed of six layers of flint and clay, 2 ft. 6 in. deep. Whatever was the level of the soil, this, no doubt, must have been a sunk and buried foundation. There occurs a very remarkable parallel to the mode of preparing the foundation of the second city built on the site of Novum Ilium (*ante*, p. 663), in which cakes of clay were used as a sort of packing for the foundations. Between each course of flint in the London wall was a bed of clay about 1½ in. thick. This structure was carried down 3 ft. into a solid bed of gravel. It would seem as if the ancient builder was of opinion that, when protected from atmospheric effect, clay was reliable as a building material, and the existence of the wall confirms the truth of this opinion.

The Roman bricks are bright red, well burnt, and retain their form and sharp arrises. About the year 1844, during the construction of the railway from Gravesend to Rochester, specimens of Roman pottery were discovered, in which the bright red colour, and smooth, sharp surface, were like those of Samian ware. But the simplicity in form of some of the articles was such as to render it highly improbable that they had been imported. Like the bricks, they must, we should conceive, have been British-made. One of the Gravesend vessels, more like the saucer of a garden-pot than anything else, but smooth and bright, had the word GRACISCÆ on it in raised characters from an indented stamp. The Society of Antiquaries have not as yet explained this word. It seems to indicate the existence of some Roman earthenware manufactory in the valley of the Thames; and the red bricks in London wall seem to us to tell the same tale.

We now come to the question of the mortar. And here we would ask our readers to compare the perfect petrifaction of the lime used in the old Roman work in this country with the crumbling condition of the mortar in many of the ruins of 300 or 400 years later date. Who has not been struck with this in examining such a ruin as Kenilworth, or in making his way up the turret staircase of some long-deserted keep? If we compare the Roman mortar of the third or fourth century with the London mortar of to-day, what is the result? The architect shakes his head, but is unable to repress a smile at the question. "Yes," he says, "but look at the age of the one." Is that a satisfactory reply? We at once admit that a certain time is assignable during which well-prepared mortar gradually becomes more and more solid, more and more, to repeat the word purposely before used, petrified; but we do not think that, when a certain time has gone by, the process continues. Between a house of six weeks old and one of six years every one can perceive the difference. Go back to sixty years and you may, perhaps, say the same. From sixty to 600 we are not prepared to say what takes place. But as between, let us say 1,200 and 1,600 years, we do not think that at all events any solidifying process goes on. Things being alike,—that is to say, the mortar being as well made by the castle-builders of the twelth or fourteenth century as by the wallers of the third or fourth century, we think that any difference in solidity could not be expected to be in favour of the latter.

We conclude, then, that the builders of the Roman wall of London made use of British materials, to which they applied the patient forethought and thorough integrity of execution that characterise Roman work. They dug the clay of the valley of the Thames, and instead of moulding it into thick blocks hard to bake, and next to impossible to bake thoroughly through, they moulded it into flat 1½ in. plates, on which the vitrifying process could have full effect, and which are almost, if not quite, as durable as fire-brick. As to brick, then, there is no doubt. But how about the mortar? As to that, also, we have ourselves no difficulty. The Romans used British lime, whether burnt from the chalk from Gravesend or from some other and harder stone it is for the chemist to tell us; but they made it into mortar in the Roman method. What is that? a reader may ask. We have, we think, before now, mentioned in these columns what it was; but, if so, it may well bear to be repeated. It was the diametric opposite of the present English method. There are many builders and persons conversant with public works who can remember the immense care which Mr. Brunel bestowed upon his specifications, and the elaborate system of inspection by which he effected the practical application of his rules. No one, as far as our experience goes, in modern times, so laboured to secure the greatest excellence of work. It fact, it is well known that what Mr. Brunel called rubble would be called ashlar by some of his contemporaries, and that the rigidity with which his orders were carried out made it by 10 per cent. or 20 per cent. more costly to execute his designs than those of some of his brethren. Mortar, of course, exercised much of his care, and the mortar that he used was mixed hot from slacking the lime. If any remained to the next day, it was to be thrown away. Such was the specification; and although that was an extreme case, we apprehend that nine

builders out of ten would say, if it erred at all, it erred on the right side.

In Italy an opposite view is taken, and an opposite method is adopted. The first practical preparation for building in that country is to dig a large oblong square pit, into which the lime is thrown when burnt, and covered with water. It is thought desirable to throw in at once all the lime that will be required for the building, and the longer it is before it is used the better it is considered to be. It forms a dense paste, which is taken out with a spade and mixed with sand or pozzuolana as required. It is usual to keep it moist, but we have never heard of or seen any thrown aside for any cause at all. The magnificent character of the work done with this mortar is well known. The Italians of many districts are born masons. Where we should call in the carpenter, and rig up a shore, a centre, or a set of props, the Italian builder runs up a temporary wall. He saves the cost of wood, for he can use the stone over again; and his temporary work, if required, will last almost as long as his permanent work. In the cases, which are far from uncommon, of damage to building from earthquake, the wonderful celerity with which they are repaired is quite a phenomenon. Again, many of the Italian roofs are made of a species of mortar, a mixture of lime and clay, beaten for a week or ten days incessantly with clubs or mallets. The surface is quite water-tight, a condition by no means to be obtained by English mortar. Again, for plasters of all kinds, down to the smooth surface which lends itself to the rapid brush of the fresco-painter, the excellence of the Italian lime, notwithstanding the wide geological range from which the limestone is taken, is something that is unattainable in England. It is all very well to say that the genius of the English school does not tend to work in fresco; there is something more than that. The English artist has not the opportunity of exercising himself by that most artistic use of his implements.

We recently saw a very remarkable illustration of the difference effected in the same material, and that, too, a cement, by the mode of treatment. We know an artist of rare patience and skill in the restoration of broken china. We know of a dragon vase, once fractured into twenty-five pieces, and of a china plate, shivered into nearly forty bits, that are now on their owner's shelves, without any visible mark of a crack. The cement that was used is that known as the "Mend-all cement"; but, of course, the skill goes for much more than the choice of material.

The artist in question, however, has long been careful to procure the smallest possible bottles of the cement; and that for the following reason:—The material is prepared for use by dipping the bottle containing it in hot water. It then becomes fluid, and is easily applied to the edges to be joined, the fragments being themselves kept in hot water, and taken out and wiped before being cemented and put into place. If a large number of mends are made, and the whole affair gets out of shape,—which it is very difficult in that case to avoid,—the mended article is again put in very hot water, when it comes to pieces at once. Each piece has to be carefully wiped and re-cemented.

The objection to large bottles of cement is this,—hitherto a perfectly empirical one:—After the cement has been liquified and cooled a certain number of times, it becomes refractory. It no longer liquifies easily, if at all. It makes bad mends, or is altogether useless.

To this long-observed fact, a second observation has been added, within the last few days, which is highly significant. The bell of a "Queen's" reading-lamp, which had a large piece broken out of it some years ago, was mended by the artist in question, and has been in nightly use ever since. After the fashion of mended things, this glass shade has outlived its more robust brothers. But the line of junction was visible, and the repairer thought that it would be an improvement to wash the bell, remove the old cement, and re-cement it. The bell, however, thought otherwise. To the surprise of the operator it laughed at the hottest water, and absolutely refused to allow the crack to re-open, or the cement in any way to soften or dissolve.

This phenomenon is worthy of reflection. It is impossible to disconnect it from the behaviour of the cement in the bottle. The shade of a queen's lamp does not get so hot as to burn one's fingers, but it gets warm. The mended individual has thus been warmed and allowed to cool at least a thousand times. At what stage in the process the chemical change was complete it is impossible to tell. Very likely in twenty or thirty days. But slowly and gradually the cement has so parted with some element of solution as to vitrify, or, at all events, to unite itself with the glass in a union indissoluble by the agency of hot water, the original solvent of the preparation.

We cannot bake walls, unless it be by selecting very hot weather for their construction. On the other hand, we can avoid that soaking of the bricks, if rain happen to come on during the process of building, of which no notice is now usually taken. We know of one costly building, of which the colour is permanently and entirely ruined by this neglect. Our object is to induce the Royal Institute of British Architects, the Institution of Civil Engineers, or others whom it may concern, to investigate this important fact of the behaviour of lime or other cement. What is the effect of time on their cohesive force? Should time be allowed to elapse before the use, as is the case in Italy? Should it be combined with repeated rise and fall of temperature, as in the case of the Mend-all cement and of the lamp-glass that we have cited? Will an exposure of a certain duration to a steady heat have the same effect? And, if so, what heat, and for how long applied? These are questions of primary interest to the architect. Their solution may place a new material within his grasp. He may be enabled to rear those egg-shell domes which the imagination of Bulwer fashioned for the homes of the "Coming Race." We can never tell how far a new idea may carry us. We strongly suspect that the builders of the earliest bridge over the Tiber, or of the walls of Rome,—certainly that the builders of the Roman wall of London,—had a much clearer insight into the relation between the time spent in preparation and the permanent durability of work, than has any writer or lecturer on structures at the present day. We are not now speaking of those "Jerry builders" of whom a contemporary justly observed, *dpropos* of this very discovery of a Roman relic, that the Romans would have thrown them from the Tarpeian rock. We are speaking of thoughtful and experienced men. We are quite sure that Isambard Kingdom Brunel, were he now alive, would respond to our words by an elaborate series of experiments; and that if the result confirmed the practice of the Italian builder, he would then and there have re-drawn his specifications. We know not on whom now to place confidence for an equally earnest and practical desire to reply to such a question, but we trust that each and all of our friends who have the opportunity will do their best to aid in the formulation of the answer.

THE ARCHITECTURAL PROFESSION IN ENGLAND AND GERMANY.

In the Prussian Parliament, about a year ago, Dr. Reichensperger made an attack on the system of education and State connexions of the architectural profession in Germany. There arose in consequence in the German press a controversy, to which we referred at length in the columns of the *Builder* at the time. Up to the present day the dispute has by no means been settled. On the contrary, it has broken out again with renewed vigour. The *Cologne Gazette* is again taking a leading part in the paper war, and has just published a general review of the present state of the question. While Dr. Reichensperger condemns the German practice, and holds up England as a model for Germany in regard to the education of architects and builders and their relations to the State, the *Cologne Gazette* contends that Germany has little or nothing to learn in the matter from this country. "In our articles on the subject," says the paper in question, "we adduced evidence based on the judgments of Englishmen that the system prevailing in their country in regard to the education of the building professions has for many years been found defective and unsatisfactory. The most competent authorities in the professional societies and journals of England have declared in favour of a change in imitation of foreign models. A continuance of the present state of things, it is considered, seriously threatens the reputation of the profession in England, and endangers the industrial interests of the country. We concluded that Dr. Reichensperger had spoken in the House of Deputies about things of which he was ignorant."

In a pamphlet he has just published under the title of "Parliamentary Utterances on Art and Art Industry, together with Comments thereupon," by Dr. A. Reichensperger, the author takes up his old position and defends it against the *Cologne Gazette*. In this publication he reproduces his speech of December 6th last year (filling five pages) and accompanies it with "glosses" or comments (filling twenty-six pages) in which he settles accounts with his opponents. His remarks are mainly devoted to former criticisms of the *Gazette* upon his theories. Dr. Reichensperger predicted that the Rhenish paper would ignore his latest utterances, but, so far from doing so, the *Gazette* enters into an examination of them at great length. The Prussian Deputy is accused of great ignorance of the subject on which he presumes to lay down the law. He is charged with dragging everything into the discussion,—the system of the technical high schools, the connexions of architects and builders with the State, their various official titles, the procedure in contracts and tenders, the preparation of estimates of cost, the practical erection of buildings, the correction and improvement of the navigation of rivers, the construction of bridges,—in fact, everything, "and something further besides." The way in which he deals with these matters is, according to his critic, calculated only to show his want of thorough acquaintance with his subject.

While Herr Reichensperger charges his Cologne critic with heaping on him "contemtible suspicions and coarse insults," the latter replies that the Doctor is angry at having his ignorance exposed, and the latter is charged with having, in his pamphlet, entirely failed to meet the arguments brought against him. The essence of the charge against the Deputy is, that he urges the Prussian Parliament to adopt certain English practices which are anything but worthy of recommendation. He professes to have thoroughly studied the position of architecture, architects, and builders in England, and states that the extensive apparatus of professional officials, such as exists in Prussia, is scarcely to be found in Britain. There the system of studying privately under the masters of the profession is in vogue, and this he recommends in preference to the system of state instruction followed in Germany. There are no State examinations as in the latter country. There is no great architectural institution similar to the "Bauakademie" in Berlin. And yet, urges Dr. Reichensperger, Germans are beaten by Englishmen in all departments of the field of architecture. It would, therefore, he contended, be worth while that the Prussian Government should cause a thorough inquiry to be made into the English system. He thought the result would be to convince Germans that they might shut up their state-endowed institutions, like the "Bauakademie," and throw the keys into the Spree.

With reference to these opinions of Dr. Reichensperger, the Cologne critic writes:—"Such a laudation of a system which in England itself has for years been generally acknowledged to be defective,—acknowledged, indeed, to be a *misère*,—a system which the most eminent authorities are most energetically endeavouring to improve, bears witness to a want of knowladge of the subject that is almost inexcusable, especially when the place where those opinions are delivered is taken into consideration. They are the less to be excused, as they will serve as a foil to other attacks on our own [Prussian] system, and our own architects, and their achievements."

The writer refers to a former article in the *Cologne Gazette* for an unbiassed description of the real state of things in England, and adds that his earlier remarks have been discussed by the English professional organs in a manner which deserves his most grateful acknowledgment. The most widely-circulated English technical journals had given their readers a *resumé* of his criticism; as, for instance, the *Builder* (March 13), &c., and afterwards some American organs. The English papers had understood how to go to the kernel of the matter, as the titles they had prefixed to their articles showed ("Technical Education of Architects in England and Germany," &c.). These articles, the German writer says, did not charge him with making any mistake, nor did they dispute his assertions respecting the English system. On the contrary, they so far agree with him that the system here required a thoroughgoing improvement. From the perception of the deficiencies of the

present system, the English will proceed to an attempt to remedy them. This, in the writer's opinion, is guaranteed by that most laudable absence of prejudice with which they have accepted the comments of foreign critics.

An interesting contribution to this question, continues the writer, is presented in the recent speech of the president of the largest English architectural association, the Royal Institute of British Architects. We have formerly explained that, in England, architecture has no connexion with the Government. State institutions, like our high schools for the education of technical men, do not there exist. On the other hand, the great technical societies step into the breach, and devote their energies to providing some portions of that higher instruction which, in other countries where self-government is less developed, it falls to the State to supply. Thus, the great London society above mentioned does what is in its power to make up for the deficiencies of the English system by providing a preparatory course of instruction for young architects after the Continental method.

How greatly assistance of this kind is needed appears from a remark of the president, Mr. J. Whichcord, in an address published in December last. He referred to a question mooted at the Institute in 1874, in a discussion respecting the defective preliminary training of English architects, when it was asked, "What measures should be taken by the Institute or otherwise in order to make certain that the young men who call themselves architects shall learn something more of architecture than they are in the habit of acquiring in the offices where they sit for a long time copying plans and drawings?" The reply to this question amounts to a strong condemnation of that English system of masters' schools so highly praised by Deputy Reichensperger. It will shortly be seen by the inauguration of a new practice in England. It is intended of institute that very system of examinations which Dr. Reichensperger so greatly despises. It has been resolved that from May, 1882, all students of architecture shall, before being admitted into the Institute, undergo an examination, the nature and extent of which the committee will prescribe.

In speaking of the position of architecture in England, we must, to our regret, once more refer to the results of the competition which took place in 1872 for plans for a new building for the German Parliament. In opposition to Dr. Reichensperger's statement, that "in every direction we (Germany) are beaten by Englishmen," we adduced this international competition to prove that in point of genuine and intrinsic worth German architecture was by no means inferior; and we showed that the English plan which gained the second prize showed various important defects. Herr Reichensperger is highly indignant at our remarks. He charges us not only with being untrustworthy in our facts, but also with casting "mean suspicions and contempt on the decision of the jury," and, indeed, with heaping coarse abuse on the design in question and on its authors. We confess that we are to some extent disconcerted at this want of caution on the part of Herr Reichensperger. We had given him credit for greater capacity for understanding architectural designs than he here seems to show, as the obvious defects of the plan in question are manifest to any non-professional observer. On the other hand, it is impossible to understand how a gentleman who himself belonged to the jury should know so little of the feeling in professional circles, and of their criticism upon the design, that he thinks our remarks are singular. We should hardly have trusted ourselves to utter such a judgment if we had been alone. But it is as we said. The award of a prize to the English project was publicly spoken of in professional circles as scandalous, but for this hard judgment substantial reasons were adduced. The *Deutsche Bau-Zeitung* made itself the vehicle for the prevailing feeling, and expressed itself to the following effect:—

"That the production of the two English architects, in regard to the first and most indispensable basis of every architectonic work,—the satisfaction of the practical requirements of the design,—leaves almost everything to be desired will have become clear to our readers even after a superficial study of the plan, and will have filled them with increasing astonishment. We do not say that all the apartments demanded in the programme are not there, with the dimensions required. But in what order are they arranged? The committee and sectional rooms, and the business apartments for the Federal Council, are scattered all about the house. The president's dwelling is distributed through four stories,—that of the director of the bureau through three. The refreshment department is in a story below the hall of session. The festival saloon and the offices lie isolated in the projecting wings, and are difficult of access from the rest of the building. Not a few of the corridors are dark or most scantily lighted. With still greater astonishment do we contemplate the way in which the plan fulfils the requirements of such a building, considered as a monumental edifice combining dignity with beauty. What is to be said when we find the transverse axis of the cupola in the front hall, which has required a gigantic expenditure of expedients to give it prominence in the external architecture, runs dead in the interior,—that is to say, debouches on the urinals? All the power of the architects, their entire thought and endeavour, have been exclusively directed to give external effect to their work,—to make it look as splendid and rich as possible; and the artistic feeling of us Germans turns away offended from so thoroughly hollow an effect, which, instead of suggesting sound thoughts, brings only a deluge of dazzling phrases, concealing behind them the most extreme poverty. If we may briefly state our judgment on the design, it is, that as a study in the decorative adaptation of the architectonic forms of the Transition style, and as a picturesque production, it is not uninteresting; but, on the other hand, it does not contribute a single element towards a real solution of the task,—the designing of a German Imperial House of Parliament."

So far the *Deutsche Bau-Zeitung*. The Cologne critic, in continuation, says that many persons wished to judge the plan less harshly, but they were influenced by the circumstance that the six architects who were on the jury participated in making the award, and concluded that they acquiesced in it as an act of international courtesy (!). The criticism above quoted, however, was the unvarnished opinion of German professional circles, and the journal in question, in afterwards discussing the competition, was able to state that it had heard not a single voice that had ventured to defend the award of a prize to this design. This has been left for Deputy Reichensperger to utter, and we beg him to inquire in professional circles and try to find a single professional man who would defend this defective project. Herr Reichensperger, in one of his glosses, says, "In my opinion it does not require a well-schooled so-called scientific education, in order to distinguish genuine splendour from a hypocritical tinsel gaudiness, and to judge whether a church or a public building answers its purpose, or whether a dwelling-house affords its occupiers, down to the servants, light, air, and as much comfort as possible." In the above case, however, he gives a very weak proof of the correctness of this "opinion" of his, and shows very clearly what happens without a "well-schooled education." He perhaps understands now why we have been silent about the names of the English authors of the plan, though, of course, as a purely matter-of-fact discussion about the superiority of English architects over German, names are altogether unimportant. Deputy Reichensperger has been decidedly unfortunate in his examples taken from England, and only shows the sort of thoroughness with which he has studied the state of things in that country. There is certainly no country in the world which sends so many technically-trained professional men, old and young, abroad as Germany, for the purpose of studying foreign productions; and every year a large number of such persons in pursuit of knowledge go to England,—the best proof of the esteem in which Germany holds the sister nation across the Channel in regard to certain departments of the technical arts. On the other hand, England is one of the last countries which is visited, whether by Germans or by other nations, for the purpose of studying architecture. Still less do people go there to learn what arrangements are deserving of imitation as models in reference to a preparatory training for this profession. In these two respects, however, the excellence of its architectural creations and the system of preparatory training for architects, Herr Reichensperger has unhesitatingly awarded the palm to England.

In conclusion, in order to obviate misconceptions, we wish to caution the reader against supposing that we considered our native system of architectural education, professional organisation, and productions as being all perfection. No one more than the professional man himself is convinced that in all these respects we are open to improvement, and that we ought to work hard to do away with the defects of the forced economy of past times, and to alter and perfect the organisations hitherto existing. This is not the place to pursue the present argument, or to suggest new ideas. We have here only to protest against the manner in which Herr Reichensperger criticises the architecture and architects of Germany, especially their relations to Government. His representations are calculated, unjustly, to spread the notion that there is "something rotten in the State" in regard to the profession in question. That against which we most particularly protest is his attempt to discredit the academical training of German architects and his advice "to throw the key of the Bauakademie into the Spree." One who is capable of giving such advice ought to think ten times before venturing to utter a word about technical matters in a public assembly. For nothing evidences ignorance of the nature of modern technical art so clearly as such a want of appreciation of the daily increasing importance of science in every department of the arts.

SOME BILLS FOR THE WORKS AT BLENHEIM.

WE have printed the following bills for works done for the Duke of Marlborough at Blenheim Castle in the years 1709-10, under the direction of the architect, Sir John Vanbrugh, from the originals now in the possession of Mr. Stephen I. Tucker, Somerset Herald. Four of them are signed by Vanbrugh and receipted; the fifth is not signed by him, but is endorsed paid at London. In the third bill forty cards of kid's hair are priced at 6d. per card, but moneyed out as if at 6½d., viz., 1*l.* 1*s.* 8*d.* And in the last of the bills given it will be observed that a rod of brickwork is described as containing 272 ft. *cube*. These bills will doubtless be interesting to some of our readers, as affording means of comparison in respect of prices. The troubles which befell Vanbrugh during the building of Blenheim through the inconsistency of Parliament, and the evil spirit of Sarah, Duchess of Marlborough, are well known. He says, in a letter to Jacob Tonson,—"I have the misfortune of losing, for I now see little hopes of ever getting it, near 2,000*l.*, due to me for many years' plague and trouble at Blenheim, which that *wicked woman* of Marlborough is so far from paying me, that the Duke, being sued by some of the workmen for work done there, she has tried to turn the due to them upon me, for which I think she ought to be hanged." The strange history of the building of Blenheim is told in D'Israeli's "Curiosities of Literature." A reason for Somerset Herald's regard for Vanbrugh's autograph may be found in the fact that he for a time held the office of Clarencieux King of Arms, an appointment which enabled Swift to insinuate that Vanbrugh's new title enabled him to "build houses" in more ways than one. Vanbrugh was always well abused, and Pope's spite has done as much to keep his name in memory as Blenheim or Castle Howard. He was a man of original genius, and even the bitter little poet of Twickenham admitted that he was "a man of wit and man of honour."

May, 1709.

To Robert Wetherilt, Plaisterer, for work done at the Mannor House in Woodstock park, for his Grace the Duke of Marlborough:—

	£.	s.	d.
ffor 401¼ yds. of Plain Ceiling.....at 6d. ℔ yd.	10	0	10
ffor 900 yds. of Rendering walls.... at 4d. ℔ yd.	15	0	0
ffor 658 foot 7 in. Run of Small Molding 6 in. deep..... at 9d. ℔ ft. run	24	13	11
ffor 63 foot Run of Small Molding, 1½ in. deep ..... at 2½d. ℔ ft. run	0	13	1
	£50	7	10

May, 1709.

To Mr Tho^{s} Joseph for Oak Timber, bought of him at New Ditch Quarter, in hanger Walk, in Whittlewood forrest, Northampton Shire, for his Grace the Duke of Marlborough use at Blenheim Castle, Woodstock Parke:—

	£.	s.	d.
foot cub^{ic}			
For 570 of Oak Timber at 8^{d}· per foot cub^{ic}.....	19	0	0

Measured and cast up ℔

This Bill according to y^{e} prise above agreed on amounts to the sum of Nineteen Pounds.

Allow'd ℔ me, J. VANBRUGH.

Sept. 15th, 1709. Rec'd. of Mr. Henry Joynes the sum of Nineteen Pounds in full of the above bill.
£19 0 0 ℔ me, Thomas Joseph.

June, 1709.

To Rob^{t} Wetherilt, Plaister^{r}, for Days Works ℔form'd att Blenheim Castle; in Stoping of windows, after y^{e} Masons, in Atick Story, in Kitchins wing; and Botoms after y^{e} floors were layd there; in Stoping of y^{e} Breatches in Attick Story, in y^{e} Maine House, y^{t} y^{e} Joyners made in puting up their Wainscott; for Takeing Downe y^{e} Lathing of y^{e} ont Roome next to y^{e} Servants Hall; and two Groins in y^{e} same passage; and for Stoping and Mending serveral Jobbs at y^{e} High Lodge, &c., for y^{e} Service of his Grace y^{e} Duke of Marlborough, in Woodstock Park:—

	£.	s.	d.
ffor A plaisterer 40 Days at 3s. ℔ Diem	07	07	00
ffor A Labour^{r} 26½ Days at 2s. ℔ do.	02	13	00
ffor 40 Cards of Kid's Hare at 6d. ℔ Card ...	01	01	08
ffor 8 thous^{d} of Lath Nails at 18d. ℔ thous^{d}...	00	12	00
	£11	13	08

The Above-mention'd Acc^{t} is certifid ℔ y^{r} Humble Serv^{t}, W. Jefferson.
Allowed ℔ J. Vanbrugh.

Aug. 10, 1710. Recd. of Mr. Henry Joynes the sum of Eleven Pound Thirteen Shillings and Eight Pence in full of y^{e} above bill.
£11 13 8 ℔ me Robt. Wetherilt.

Jany. 24, 1709.

Measur'd and cast up ℔ Henry Joynes.
Tilleman Bobart.

This Bill according to the sev^{ll} prises agreed on ℔ contr. amounts to y^{e} sum of fifty pound seven shillings and ten pence.
Allow'd ℔ J. Vanbrugh.
Henry Joynes.
Tille. Bobart.

July 29, 1710. Rec'd of Mr. Henry Joynes the sum of Fifty Pounds Seaven Shillings and Ten Pence for full of my above bill.
£50 7 10 I say rec'd ℔ me, Robt. Wetherilt.

July, 1709.

To Edw^{d} Strong, sen^{r} and Edw^{d} Strong, jun^{r} for Days works done att Blenheim Castle in Woodstock parke for his Grace y^{e} Duke of Marlborough:—

In cutting way for port^{ld} steps and halfpaces in y^{e} square staircase, N. Quadrant, from y^{e} Celler story up to y^{e} first floor, wedging in y^{e} s^{d} steps with Iron wedges, also plugs of Iron Lett into y^{e} Joynts of y^{e} halfpaces and runn with Lead also Cutting with Iron drills and tooles made for that purpose holes in ends of steps as at A [section drawn] to fix y^{e} iron work in in Lady dutches back stayrs and East onall stayrs from y^{e} Celler floor up to y^{e} stayrs that lands into y^{e} towers stamping y^{e} Lead into y^{e} holes to make fast y^{e} Iron work and triming of it of smooth with y^{e} steps, &c.

Masons att 2s. 4d. ℔ diem.

	July y^{e} 11	18	25	Aug^{t} 1st			
Edw^{d} Carver...	//////	//////	//////	//////	2	16	0
Jno. Carver ...	//////	//////	//////	//////	2	16	0
Jno. Ogle	//////	//////	//////	//////	2	16	0
Geo. Asley ...	//////	//////	—	—	1	08	0
	Aug^{t} 8	15	22	29			
Edw^{d} Carver...	//////	//////	//////	//////	2	16	0
Jno. Carver ...	//////	//////	//////	//////	2	16	0
Jno. Ogle	//////	//////	//////	//////	2	16	0
Geo. Ashley ...	//////	//////	//////	//////	2	16	0
	Sep. y^{e} 5	12	19	26			
Edw^{d} Carver...	//////	//////	//////	//////	2	16	0
Jno. Ogley.....	//////	//////	///	—	1	15	0
	Octo^{r} y^{e} 3^{d}	10	17	24			
Edw^{d} Carver...	//////	//////	//////	//////	2	16	0
Jno. Ogle	//////	//////	//////	//////	2	16	0
					£31	03	0

This acc^{t} was Examin'd that y^{e} said Worke was done at Blenheim. Henry Joynes.
Tille. Bobart.
Allowd ℔ J. Vanbrugh.

Jany. 13th, 17$\frac{1}{4}$. Recd of Mr. Henry Joynes the sum of thirty one pound three shillings In full of y^{e} above bill for Mr. Edw. Strong.
£31 3 0 ℔ me Chr Cass.

July, 1710.

To M^{r} Tho^{s} Churchill & M^{r} Rich^{d} Stacy, Bricklay^{r} Worke done by them at Blenheim Castle, In Woodstock Parke, for y^{e} Service of his Grace y^{e} Duke of Marlborough:—

A Remaining part of y^{e} Back wall of the Greenhouse; the upper part of sev^{ll} party Walls in y^{e} Attick Storry next the Roofe in y^{e} Grand Pile, and sev^{ll} doreways stop'd up these and partioning filld up wth brick there, and in y^{e} Attick Storry over y^{e} North East Stable in the West Wing of Offices, &c., and Vaulting at y^{e} foot of y^{e} Staircases in y^{e} East Wing of Offices, &c., and Vaulting in y^{e} South and North Corridors upon Grand flo r in y^{e} Grand Pile:—

	£.	s.	d.
ffor 53¾ rods 63 foot of Brickworke, estimating 272 ft. cub. to a Rod, at 25s. ℔ Rod	67	9	5
ffor 7¼ rods 62 foot of ditto in Vaultings, at 28s. ℔ Rod	10	16	5
ffor 561 yds. 1 ft. of Partioning filld up with brick at 6d. ℔ yd. sup^{ll}	14	0	6
ffor 210 foot 0 in. run of Splays, at 1½d. ℔ fo^{t} Run	1	6	3
ffor 50 foot 0 in. Run of Groining, at 4d. ℔ foot Run	0	16	8
	£94	9	3

Measur^{d} and cast up ℔
This Bill according to y^{e} sev^{ll} prises Allow'd & agreed on ℔ Cont^{r} amounts to y^{e} sum of Ninty four pounds nine shillings and three pence.
Allow'd ℔

THE ARCHITECTURE OF MADEIRA.

It would hardly be supposed that anything architecturally interesting is to be found on an Atlantic island 380 miles from the nearest mainland, Mogador, and more than 500 miles from St. Vincent, the nearest architecturally civilised coast. The island, in truth, owes little to man's interference. Its interest centres in the sublime grandeur of the central axis and the northern side of the island, which is intersected by deep cañon-like gorges, whose dark walls rise almost vertically for thousands of feet. All is massive basalt, built up of successive overflows from a mighty central crater, so new geologically that the plants here and there enclosed and petrified are of existing island species, and the only record of changed conditions they anywhere entomb is a tiny coral reef. Alternating with the lava flows are layers and layers of earth burned to a bright cherry red, and sheets of pumice-stone and ash. The possession of every ledge and every fissure is disputed by numerous kinds of laurel, giant trees which "ripen, fall, and cease."

Ferns clothe the moist ravines. Woodwardia fronds cut to shade my hammock measured 9 ft., and in remote glens the bright feathery fronds of Dicksonia, 12 ft. long, curve to the ground, and delicately translucent ferns, elsewhere rare, twine round every stump and rock. The backbone of the island rises 6,500 ft. in wildly jagged peaks, in climbing which the sea horizon rises with you as it does in Teneriffe, taking on the appearance of a high blue wall, and melting into sky a hundred miles away, while at other times a white billowy expanse of cloud stretches beneath you.

The island was discovered in the reign of Edward III. The story is a romantic one, and often told, discredited, and lastly proved beyond all doubt. Lost sight of, it was re-discovered in 1414 again through accident, by Zarco, and Tristam Van Teixeyra, two squires to Prince Henry, the navigator. The spiritualities of the island were made over in perpetuity to the Order of Christ by Don John I., and the papal confirmation granted in 1442. The earliest existing edifice, once a small chapel, now a coal-store on the western outskirts of Funchal, is low, with square windows, and none but the plainest buildings appear to have been erected until almost the close of the fifteenth century.

Funchal, the chief town, reminds one in its situation, of Naples. There is no harbour; vessels lying in the roadstead simply trust that the prevailing northerly winds will continue to blow. The hills slope rapidly, and are studded with villas to a height of 2,000 ft., where these and vineyards give place to pine woods. In 1508 it was made a city, possessing equal privileges with Lisbon; in 1514 a bishopric, and in 1539 an archbishopric. The cathedral, commenced in 1485, and opened in 1514 under the auspices of a Captain-General surnamed "O Magnifico," is anything but of archiepiscopal dignity. A plain Italian Gothic building, with square whitened tower and glazed-tile spire, is only curious as being Gothic in form with no trace of Gothic sentiment. Moorish influence is apparent in the capitals; and the juniper-wood roof, as in other churches in Madeira of the same period, is an interlaced, purely Moorish design. The altars and their furniture are unusually tawdry, and everything is meretricious except a finely-executed, but poorly-designed, wrought-iron grille. The more ancient eastern part of the city has twice been almost swept away by floods, but a good example of the ancient architecture is still standing close to the western gate. A courtyard is overlooked by windows of two lights, with semicircular heads to each, and divided by a slender pillar, with foliated capital of peculiar design. The general appearance is Lombardic, but a closer inspection reveals a thoroughly Spanish Renaissance character. At one end is a paradoxical triple-lancet window, like thirteenth-century work; and the ceilings, rafters, &c., are of the same Moorish design as the cathedral, and borrowed apparently from the church of St. Francis d'Assisi. Another house, reputed erroneously to be that of Columbus, has just been removed to make way for a so-called improvement. The windows had the same Lombardic double-lights, with the striking peculiarity that the sill, instead of being level, drops to the centre mullion at an angle of 60°, the mouldings of the jambs being continued down the slope and stopping against the base. Setting back from the front, there is a stone filling-in with a horizontal line continued about a foot above the commencement of the slope. The capital of the centre mullion and the two terminations, for they can scarcely be called caps, to the side-jambs, are sculptured with considerable spirit. The whole appearance is perfectly unique, and there is probably no similar window on the European continent. The Custom House, almost on the beach, has a vaulted basement with pillars of octagonal plan, and capitals with a quatrefoil leaf on each face, curious as a rough reminiscence of the Spanish late fifteenth-century carving, where capitals are composed of three or four vine-leaves, and depend for their light and shade on the foliations of the leaves. These pillars support round arches, while the doorways are pointed. Exteriorly, four large gurgoyles are interesting. These are apparently of lead, and of the seventeenth century, two being grotesque monsters pointing muzzles of cannon; a third, the head and front of a game-cock; and the fourth, a frog-like monster. The most interesting building is a convent, on high ground, in which is Zarco's tomb. It has the same vaulting and architectectural features as the cathedral; but the walls are completely lined with Hispano-Moresque tiles, richly arabesqued in blue and orange-yellow. The tomb is a rough sarcophagus built into the wall and resting on Lombardic lions, with decipherable legends. The recess is arched and moulded in the Early English style, with Decorated tracery and capitals. The nuns attend mass behind wrought-iron grilles. The later churches, two of the town gates, and a few public buildings, are of heavy Spanish-Jesuit style. At Santa Cruz, the second town in the island, the principal square is entirely surrounded with buildings of the fifteenth century, similar to those described above, and including a cathedral, hospital, prison, &c.

The streets in every town are narrow, and paved with cobbles worn smooth by sledges and bullock-wagons. The houses are rectangular, more often one-storied than two, but frequently carried up three or four additional floors in a square tower, in order to command views over the bay. The material used is rubble, with angles of dressed drab lava, cleanly white-washed or tinted buff or rose, the dressings being painted a different colour or left the natural stone. The windows are fairly large, protected by green jalousies. The roofs, tiled red or buff, slope from each face at 25°, and project several feet over the streets, the buff tiles and white mortar in which they are set forming pretty overhanging cornices, which never seem to soil, and cast an agreeable shade. The better houses have wrought-iron balconies of excellent workmanship and great diversity of design, and it is lamentable to notice that these, one of the chief features, are being replaced to some extent with common cast-iron from England. The basement windows are invariably protected by massive grilles, in which the bars are threaded through each other in the old way with as many as 200 interlacings to a moderate-sized window.

Take it altogether, no style could be more suited to the climate and support more effectually the theory of evolution in architecture, for it can claim to be as much evolved from the insular and sub-tropical conditions as the zoological features undoubtedly are. The dwellings are rendered more pleasing and

characteristic by clumps of banana, occasional date-palms, and trellised vine, and some enclose inner courts full of gardenia, stephanotus, and heavily-scented flowers. Three castles frown over the city, one in its centre, one above it, and one on a rock rising from the bay in front. They have sloping sides, technically known as "battered," pierced all over with mock casemates, and battlemented, and are stagy in appearance, and, of course, utterly useless for defensive purposes.

The commerce and enterprise of the place are English. Every ship in the harbour seems consigned to Blandy Brothers. The wine trade lies almost entirely in the hands of the great house of Cossart, Gordon, & Co., and other almost historic English names. The beautiful and well-kept villas in the outskirts are owned and were built by Englishmen, and the native press laments that the island is not under English rule. The only flourishing Portuguese building, a splendid hospital, and the gift of royalty, is directed by an English gentleman. Purely Portuguese undertakings are often ridiculous failures. A short road from the Custom-house to a small landing-stage, the Pontinha, was breached by the sea, and abandoned before half completed. A huge mill, covering an immense area, with machinery, costing 100,000 dollars, from St. Quentin, of power enough to crush in a week all the sugar-cane grown in the island in a year, has never even been opened. The finest building, a Franciscan Convent full of inlaid marbles, was pulled down, and the tombs of the old families violated, to make way for a Palais de Justice. The foundations were so Titanic that before they rose above the ground the whole available money was absorbed, and the building abandoned. After a long interval, this stony desert of building material and massive walls is to be converted into a botanical garden. As a preliminary, some magnificent palms, previously spared because the finest in the island, were felled. A large Lazaretto, built in separate blocks in a picturesque little bay, has just been condemned on the eve of opening, because too near the town, and the port is still without quarantine accommodation. A water-course pierced for miles through the rock, and found to run uphill, and a sea-wall, knocked down by the military to permit the retreat of troops from the beach in case of invasion, are other monuments of folly. On the other hand, the Government system of irrigation is beyond praise, and has involved in many cases enormously difficult engineering works; while the Portuguese system, which is to return to the island part of the taxation if required for public works, offers a direct premium to the Madeirese to embark upon any work, however unproductive, which will cause their own money to return to their own country. J. STARKIE GARDNER.

ARCHITECTURE AS INFLUENCED BY CUSTOM.

BY W. PETTIT GRIFFITH, F.S.A.

"From all arts and sciences whatsoever, there are drawn certain principles, rules, or natural conclusions, which if we shall appiy ourselves with all care and diligence to examine and make use of, we shall undoubtedly find the benefit of, by the perfect accomplishment of whatsoever we take in hand."—FRART.

IN treating of architecture, there is an important distinguishing feature much overlooked in the present age. Wren, in the "Parentalia," very pointedly alludes to it; he says that "there are two causes of beauty, natural and customary. Natural is from geometry, consisting in uniformity [that is, equality] and proportion. Customary is begotten by the use of our senses to those objects which are usually pleasing to us for other causes; as familiarity or particular inclination breeds a love to things not in themselves lovely. Here lies the great occasion of errors, here is tried the architect's judgment; but always the true test is natural or geometrical beauty."

It is not surprising that architecture is influenced by custom, as it prevails over everything:—

> "Custom, that does still dispense
> An universal influence;
> And make things right or wrong appear,
> Just as they do her liv'ry wear."

Reynolds observes that the prejudices in favour of the fashions and customs we have been accustomed to, and which are justly called a second nature, make it too often difficult to distinguish that which is natural from that which is the result of education.

In a paper entitled "On the Influence of Fashion in Architecture," read before the Liverpool Architectural Society in 1863,* I directed attention to the styles of architecture as reproduced at various epochs to suit the ever-varying taste of the public; but the object of the present paper is to point out the abuses which have been introduced into regular architecture, sanctioned by custom, although contrary to common sense and the original intentions of the early architects. Fashion in architecture refers to the reuse of existing styles (the idea of a new style having been shipwrecked long ago), and has no bearing upon architecture as perverted by custom. The latter, consequently, is by far the graver question of the two, as the creation of architecture has to be considered and not simply its modern use.

> "Custom, the world's great idol we adore;
> And, knowing this, we seek to know no more.
> What education did at first receive,
> Our ripen'd age confirms us to believe."
> POMFRET.

Although custom often constitutes a moral rule in cases where no legal dictum prevails, it does not always do so. For instance, it was the custom when Classic architecture was the fashion, to denounce the Gothic; hence, in 1724, Tickell, in alluding to Queen's College, Oxford, says:—

> 'Mark that old ruin, Gothic and uncouth,
> Where the Black Edward pass'd his beardless youth.'

Custom has introduced many abuses, contrary to reason and ancient rules, which for years have been rules of architecture, because

> "Some lucky licence answer to the full,
> Th' intent proposed, that licence is a rule."
> POPE.

These abuses should be carefully considered by all who desire to produce correct architecture; the more so, as time cannot render irregularities legitimate, nor can authority justify abuses of taste; for

> "Custom does not reason overrule."
> ROCHESTER.

No errors, however ancient, or however countenanced by long practice, are fit objects of imitation. If rules were laid down for determining with precision what ancient monuments are of the true standard principle of correctness, they would greatly contribute to accelerate the progress of architecture; but, to ascertain such rules would require the qualifications of the philosopher, united with those of the architect. He whose mind is enlightened by these reasoning powers knows how to stamp a just value upon works of real merit, and to reject any excrescence that "old Time," as Milton says, "with his huge drag-net, has conveyed down to us along the stream of ages."

Some of these abuses have been pointed out by Vitruvius, Palladio, Perrault, Chambers, and others. Among them may be named the swelling of columns. Freart blames the practice of making "pillars swell in the middle, as if they were sick of some lympany or dropsy," and he justly remarks that it is contrary to the original and natural type in trees.

A column with straight lines would appear concave to the eye, consequently curved lines are requisite; but whether the curve should have the greatest diameter at the base or at about one-third up the column is a point for consideration. Vitruvius says that it is made in the middle of the column. This is absurd, as he has no authority for it. The curve should start with the greatest diameter at the base, unless there be any truth in the assertion that bodies must diminish as they recede from the eye. In this case, the greatest swell would be a certain distance up the column. Vitruvius perhaps took the idea of fixing the greatest swell in the middle of the column from his composing the Doric column upon the model of a man, the centre of the latter being his navel: of course there is no authority for anything of the kind.

Sculpturing modillions and dentils of pediments perpendicular to the horizon, and not to the slope line of the pediment, is erroneous; but custom has adopted this innovation. So, too, putting modillions on the four sides of a building, and in the horizontal cornice of the pediment; modillions being proper on those sides only where the rafters are set, whose ends they represent, and not in the cornice that runs under the pediment.

Making several breaks in the horizontal entablature or cornice of a pediment.

* See the *Builder*, vol. xxi., p. 38.

Breaking entablatures over columns and pilasters, particularly if there do not appear to be the same occasion for it as may be perceived in the triumphal arches at Rome, or other structures of a symbolical description, where the breaking of the entablature indicates the characteristic intention for which the columns were so introduced; namely, that of supporting emblems expressive of commemorable events, and in that instance not unappropriate.

Perrault says, neither ought we to make statues placed above larger than those set below, when they are of the same kind, that is, when both stand each in its own story or order. But, on the contrary, they ought always to be diminished, as the orders are, which are necessarily less than those below.

It is not only important, but necessary, to judge of the sizes of objects to be placed on lofty erections. It was remarked in "Roma Illustrata," 1721, and in 1806, by an architect who visited France and Italy, that the figures high up in the bas-reliefs of Trajan's column are somewhat larger than those below; the perspective reducing them to an equal size to the eye. By referring to Taylor & Cresy's Rome, it will be found that this assertion is not correct: the twenty-three blocks of white marble are all of the same size, and also the figures upon them.

We are informed by Vasari that towards the close of his life Michelangelo began to study his compositions in sculpture with more care, making models, not only for statues, but also for architectural ornaments, of the full size, which he used even to place at their proper height in order to judge of the true effect of the future work.

When two or more orders are employed, one above the other, in a building, the laws of solidity require that the strongest should be placed lowermost; the Tuscan to support the Doric; the Doric, the Ionic; the Ionic, the Corinthian; and the Corinthian, the Composite.

In England there are few examples of more than two stories of columns; in Italy and other parts of Europe are to be seen three and sometimes more; yet it is a practice by no means to be imitated. Palladio attempted it at the Carita in Venice; Sangallo, in the Farnese at Rome; Ammannati, in the Cortile of the Pitti at Florence; but all unsuccessfully.

Breaking of pediments, and leaving them open in the middle; pediments being intended to throw off the rain, and not to let it in.

Breaking the entablature and making the cornice of a pediment rise from the top of a column, pilaster, or pier.

Placing two or three pediments, one within another. The ancients, observes Chambers, always avoided introducing pediments of different sizes in the same composition.

Raising pediments on circular bodies.

Employing other forms of pediments than the triangular and round. Placing balustrades on the inclined cornices of pediments, balustrades being intended to enclose terraces and other heights to prevent accidents. Also intermitting the horizontal entablature of a pediment to make room for a niche.

Putting triglyphs in any other part than over the column. Enlarging the metopes. Putting dentils below the mutules, because the feet of common rafters cannot be below those of principal rafters. Adding dentils under modillions.

Projecting the cornice too much, so as to exceed reasonable utility, and thus appear unsafe to passers by.

Adding rustics to columns and pilasters, scored like loins of pork; making columns and pilasters penetrate each other; coupling of columns, condemned by Blondel and vindicated by Perrault.

Triangular, circular, and polygonal pedestals are objected to.

Chambers objects to adorning the pedestals or pilasters of attics with moulded panels, which look like joiner's work, and should therefore be avoided; neither should they have capitals, as is always the custom in France, which give them the idea of a clumsy, ill-proportioned composition.

In France, and in Sir John Vanbrugh's works, the horizontal joints of rustics only are marked, the vertical ones being entirely omitted. This has a bad effect, and makes the building look as if it were "composed of planks" rather than of stones. Palladio's method is preferable, who, in imitation of the ancients, always marked both the perpendicular and the horizontal joints.

In the Ionic capital, forming one volute parallel and the other oblique.

Placing the Attic base under the Doric column. Using pilasters instead of columns. The Araeostyle disposition of columns suggested by Perrault, and opposed by Blondel. Piling two or three orders of detached columns one above the other. Setting the Composite column over the Corinthian was not approved by the judicious.

Using cartouches instead of columns or pilasters, as they appear deformed to the intelligent eye.

Putting the cyma or cavetto for supports instead of the ovolo and talon. It may be tolerable to omit a usual member of architecture, but it is insufferable to put it in the wrong place.

The cyma and cavetto were correctly used by the ancients for finishings, and never where strength is required; the ovolo and talon, on the contrary, were always employed as supporters.

Palladio erred in employing the cavetto under the corona in three of his orders, and using the cyma as a supporting member.

Vignola ignorantly finished his Tuscan cornice with an ovolo.

Using frets or guilloches, decorated with leaves, ribands, and flowers, instead of balusters.

Placing a sepulchral or funereal pediment (such as is found on ancient tombs, cippi, and obituary tablets), upon the houses of the living, in defiance of every principle of truth, and in subversion of every rule of architecture.

The French architects, who "do all novelties," have adopted all innovations. The fact is, the French were ambitious of forming a new school; they were to invent new orders, which were to be exclusively French; and their buildings in the age of Louis XIV. exhibit examples in which all kinds of incongruous ornament are collected together without principle or meaning. The buildings in Paris are neither Greek nor Gothic, and in the highest degree irregular and formless. Of course, there are exceptions.

These foregoing cautions of the ancient architects form good lessons to modern practitioners, which they would do well to keep in their memories, in all compositions.

The criticisms on the several parts of a stone building, by comparison with a wooden prototype, are somewhat absurd, as that which was suitable and constructively necessary in the latter had no reference to the former.

From a careful study of the ancient regular architecture, as represented and misrepresented by the Italian and other architects, and of the buildings themselves, there need be no more talking about copying; each architect, if he will but devote the time and attention to the works of antiquity, can himself adopt from them his own proportions and details. First, by pruning and rejecting all extravagances, and licentiousness, flatness, and insipidity, disagreeable to the eye, and strictly copying such things as appear to be perfect, and carefully correcting others that seem in any degree faulty; and, secondly, by not accepting apparent beauties when not founded in reason; thirdly, by not retaining any modifications dictated by custom alone; and, fourthly, by availing himself of all real improvements which are easily perceivable by a judicious eye. Sir Joshua Reynolds admits, it is true, that the beauties and defects of the works of our predecessors may be pointed out; the principles on which their works are conducted may be explained; the great examples of ancient art may be spread out before them; but the most sumptuous entertainment is prepared in vain if the guests will not take the trouble of helping themselves.

It will be well for architects to consider these alleged abuses, as many of them have been introduced with reason and judgment, and with approbation.

It will be the more necessary to do so, when we consider the vague foundation on which the more refined parts of the art are built; Chambers says that it has "given rise to such a multiplicity of contradictory opinions, all of them supported by plausible arguments, that it is difficult to make a choice, or to distinguish the real from that which is merely specious. The connexions are frequently very distant, and it is necessary to trace a precept through all the combinations, that can possibly exist in every branch of the art, before its truth or fallacy can be determined."

Although Sir W. Chambers's judgment is to be generally admired, he errs in rejecting the Corinthian capital as a support to an entablature. He says, "There are many things which, though beautiful in the highest degree, yet, in their application, carry with them an evident absurdity; one instance whereof is the Corinthian capital, a form composed of a slight basket surrounded with leaves and flowers. Can anything be more unfit to support a heavy load of entablature, and such other weights as are usually placed upon it?"

Now the Corinthan capital having originated from a nurse placing a basket on a young girl's tomb is doubted, as the temple of Solomon gave the idea for putting leaves on a capital; be this as it may, its origin does not bear on the case, as the bell off the Corinthian capital is a carved solid, and the leaves are in relief on it. If the bell were an open basket, Chambers's criticism would have displayed more sense.

The golden mean as applied to the measure of moral rectitude may have much truth in it; but surely there is no mental energy displayed in seeking a mean in architectural proportions and works. This childish plan is often had recourse to by juries and arbitrators, who in cases of compensation take the highest claim on the one side, and the lowest claim on the other side, then add them together, and divide by two. Now, although a mean is obtained, affording sometimes a correct decision, still there is no science or mental energy displayed. To the men who create the extremes by their calculations, must be awarded the credit, and not to those who without brainwork adjust the conclusions.

To judge of the precise proportion awarded to the first man, and to each of all other forms at the Creation, is difficult, unless the golden mean be appealed to for a decision; and I think that, as far as living objects are concerned, a tolerably correct conclusion may by this means be obtained. To apply a mean to art objects is absurd, as buildings and their component parts are separately created. Perrault with great labour reduced the proportions of the various orders of architecture to a mean, and Paley in recent times applied a mean to the varieties of fonts.

The course recommended by Sir W. Chambers is far more scientific and practical than the mean between extremes as suggested by Perrault. The former enters with more judgment into the subject, and endeavours to correct deviations from the antique originals.

In employing regular architecture, nothing betrays the ignorance of an architect more than a violation of the ancient rules, or to introduce in his compositions the abuses which custom, contrary to reason and confirmed by time, has imposed upon us. Chambers has justly pointed out some of these irregularities in St. Peter's at Rome, St. Paul's Cathedral, and the Banqueting-house at Whitehall. Many of our more recent public buildings abound with unmeaning novelties. In the architectural world as in the political world, there should be a liberty definitely established.

In 1728 ancient architecture was as much neglected as at the present period; an architect of taste complained of the continual spring and circulation of follies, which are in a series of false appearances connected together, and disguised by artful softness of definition, and varieties of incoherent parts, consisting of no foundation but the emptiness and shadow of appearance; and this, and this only, being the grounds and practice of most of the productions of our moderns in building, architects seem to forget that beauty is founded on reason, irregularity on fancy,—

"Can beauty from deformity arise?"
Husden.

The folly of permitting custom and fashion to prevail over the ancient rules was much deplored by Freart, who says, "Honest Vitruvius in his time well foresaw the ill consequence which those of the profession would introduce out of their love of novelty, which already began, it seems, to incline them to libertinism, and the rules of that art which ought to remain most sacred and inviolable; so that we must look on this as on a grey-headed evil, which grows worse and worse daily, and is become now almost incurable."

Instead of teaching anything new, the public require treatises to explode the errors which have been introduced by the admirers of novelty.

It is absurd for an architect to attempt to design without materials on which the mind may work, and from which invention must originate. "From mere nothing, nothing can proceed."

We should ever bear in mind the injunctions of the great masters, whose advice is always grounded upon theory and practice, and well considered. Of course they have faults, and those should be studied as well as their beauties. Variety and novelty are always valuable, provided that they are not introduced in opposition to precepts of art, and are sanctioned by reason. The more the student inquires into ancient architecture, the less will he be pleased with the new. He will derive more knowledge than the ancients because he has the advantage both of theirs and his own.

The Scriptures say we ought to "make a stand upon the ancient way, and then look about us, and discover what is the straight and right way, and so to walk in it." The predominancy of custom, remarks Bacon, is everywhere visible, insomuch as a man would wonder to hear men profess, protest, engage, give great words, and then do just as they have done before, as if they were dead images and engines, moved only by the wheels of custom.

The English architect is much indebted to Wren for his good sense and judgment in awarding the true test of beauty to nature or geometry. Of course, our Continental neighbours differ in opinion. Let us listen to Perrault,—"Neither," says he, "the imitation of nature, nor reason, nor good sense, are then the foundation of those beauties, which we fancy we see in the proportion, order, and disposition of the parts of a column; and it is impossible to assign any other cause of their agreeableness than custom."

However, notwithstanding this assertion, it has been shown that custom is not a principle or cause of true beauty. What arises from the manners and customs of particular nations can at best be but adventitious and local; and what is local cannot form a universal rule or principle; and since the principles of true beauty must be acknowledged as such by all men, therefore local custom cannot be a principle of real beauty.

I cannot do better than conclude with an admonition handed down to us by the great architect of St. Paul's Cathedral:—"An architect," says he, "ought to be jealous of novelties, in which fancy blinds the judgment; and to think his judges, as well as those that are to live five centuries after him, as those of his own time. That which is commendable now for novelty will not be a new invention to posterity, when his works are often imitated, and when it is unknown which was the original."

THE ARCHITECTURAL TREATMENT OF SMALL STAIRCASES.

At the ordinary fortnightly meeting of the Architectural Association, held on Friday, the 17th inst., Mr. Aston Webb, A.R.I.B.A., read a paper on this subject, as elsewhere mentioned. The following is the substance of it:—

There is no house so small or unpretending but that the staircase offers an opportunity of architectural treatment, and by a little care and good arrangement, and without adding to the cost, may give a suggestion of artistic feeling, and break the spell of that oppressive monotony which is the curse of so much of the general small-house architecture of the present day. The difference, also, between a well and badly planned house often lies in the staircase. Our client's property may, therefore, be seriously damaged in point of value by any omission on our part to arrive at the best staircase the circumstances will permit. One more word before entering on my subject,—namely, that I have purposely steered clear, as far as possible, of style and design in detail; for style, after all, is only the language in which an artist's thoughts are expressed, and the same beauty and feeling may be seen and felt, treated in various styles, just as ideas may be conveyed in various languages, though one style or language may often be better suited and appropriate than another to express those thoughts.

The subject naturally divides itself into three divisions:—1st. The position; 2ndly. The arrangement; 3rdly. The details of a staircase in a small house.

I.—*The Position of the Staircase in Relation to the House.*—This may be external or internal; but as I propose to deal more especially with staircases suitable to small house in this country, in the latter part of the nineteenth century, external staircases need not long engage our attention. No notice, however, of small staircases

could be deemed complete without mention of a few of these. Most of the remains of old English houses up to the close of the thirteenth century show signs of external staircases, leading to living-rooms on the first floor, which were, also, usually approached by a second staircase from the great hall, which usually up to that date was the full height of the house. The very beautiful external Norman staircase to the buildings attached to the cathedral at Canterbury is well known; but Italy, *par excellence*, is famous for these features, great and small. A very well-known one, and illustrated in our Association Sketch-book, is one at Spoleto. The position of a staircase in relation to the internal arrangements of a house is a very interesting and important question. Professor Kerr, in his book on the "Arrangements of a Gentleman's House," says "A staircase ought to be so placed as to afford direct passage for the ladies, particularly from the public-rooms, to the bedrooms." Mr. Stevenson says, "No rule as to the position can be laid down. It is usually in a conspicuous position; but when the hall is used as a sitting-room, it is better adapted for the purpose if the stair is shut off from it, at least by an open screen." Now the position of the staircase is so radical a factor in the planning of a house, that it is very important that we should have a clear and right view as to what is desired by those who are to occupy the house. Mr. Stevenson says, "it must vary in each house, and no doubt it will to some extent, though the principle aimed at will probably be the same." The same author says it is usually in a conspicuous position, also the fact, as we all know; but the question then comes in as to whether, in our present habits of life, this is desirable or not. Let us look back for a moment to the planning of our old English houses, for though our habits are much changed, and what has been can never be again, there is generally something to be learnt either to follow or avoid, and it helps to show the growth and principle on which our intricate plans of the present day are based. We shall find that up to the time of Queen Elizabeth, the houses were more or less fortified, and the staircases of stone, placed principally in turrets, an arrangement not likely again to come into general use, though at West Deane Rectory as early as the end of the thirteenth century, a newel staircase is still to be seen placed, as will be found almost invariably the case, in the corner and occupying no conspicuous position, though their existence was duly emphasised on the elevation. During the time of Queen Elizabeth, however, newel staircases came largely into use, with their straight flights and square landings; and during this time some of the finest staircases we have were put up, and many of our most thoroughly English houses were erected, the arrangements being distinctly to make the hall an apartment for general use, with the stairs leading merely from some retired corner to the rooms above, in most cases being absolutely concealed by a door; and Palladio, in his description of staircases, assumes as a matter of course that it will be so enclosed, but advising that the door should be in a conspicuous position, and in the best part of the house. Sometimes we find the stairs placed just off the hall in a lobby between the hall and one of the living-rooms, as at Wrotham-place, or, even still further away, as at Severn-end, Worcestershire (this house, by the way, is shown to visitors, and though very little known, is well worth a visit). In all these cases there is a separate staircase for servants, and the usual plan shows the hall dividing the family apartments from the servants', and connected over by the gallery. This arrangement assumed, of course, that all the reception-rooms were on the ground-floor, and the stairs led only to private rooms, and were therefore planned as private as possible. In larger Elizabethan houses, some of the principal rooms began to be placed on the first floor; here the staircase naturally became grander, but were on a scale beyond the limits of this paper. After this date, the Italian model came into vogue, where the staircase was placed in a central hall or cortile, or immediately leading off it, and this plan, with more or less modification, has continued to be largely adopted down to the present day. The Italian plan also often required the reception-rooms on a first-floor, and therefore led to a grander staircase. The demand in the present day, where the space can possibly be obtained, is decidedly in favour of all the reception-rooms being placed on the ground-floor, when the staircase should, therefore, as I consider, return to a less conspicuous position, its only object being means of access to bedrooms. The question, therefore, has to be considered as to the best position of the stairs, in a modern house, taking note of what has been done before, but not copying it, without regard to the altered requirements of the day. What I wish to lay before you is that privacy rather than conspicuity is to be aimed at in a staircase of a house of ordinary dimensions leading to bedrooms, and that with the reception-rooms on the ground-floor, the staircase is put to no use but private and domestic ones, and that where this privacy is observed, it is of advantage to all who use it, and more especially to the ladies of the household. You probably all know the story of the amateur architect who designed his own house, his great idea being a large central hall and staircase, with a gallery round on the first-floor, off which all the bedrooms opened; the consequence being when any occupant of these rooms went for a bath in the morning he was seen by the servants downstairs; and later on, when the servants were removing the slops from the rooms, they were, in their turn, seen by the guests and others from the hall below. The hall and staircase arrangement, a very common one, appears to me both wasteful and inconvenient. The staircase spoils the hall, and the hall spoils the staircase; that is to say, the hall is of no other purpose than for effect and show, it being impossible to use it as a sitting-room, and in my view, the stairs, being placed in the hall or general thoroughfare, are too public for the purposes they are intended. Another great objection, also, to this arrangement, is, that the hall has to be lighted from above only, and the proper ventilation of it becomes a matter of great difficulty, if not absolute impossibility. You will understand that I am speaking strictly of small staircases, that is, such as you will find in gentlemen's houses generally, and these remarks do not apply to houses where a portion of the building is occupied by State apartments, and where, therefore, a larger hall and staircase may be necessary for architectural propriety and to befit the apartments to which they lead. Of late years, on the other hand, the demand for cheap houses with large accommodation has led to an undue reduction in some cases in the size of the hall, where, in fact, you enter the front door, and the stairs are at your feet, and an array of little doors all round you, too suggestive of cheeseparing to be pleasant or desirable. My own idea for a country-house is a vestibule, with passage from same to servants' department as means of access for waiting at the door. The vestibule to lead into a hall, with a fireplace, of course carpeted and furnished with comfortable chairs and side-tables, and with the staircase screened off from one corner of it. In town-houses and restricted sites, the *position* of the staircase is hardly a matter of choice, and must necessarily come in the hall; but the same idea of privacy can be aimed at here also.

II. By *Arrangement*, I mean the number of flights, the landings, and their disposition. And here privacy should again be aimed at,—privacy, that is to say, from strangers coming to the entrance-door, and the simplest way of obtaining this is by reversing the flights so that you go up in the direction of the door rather than come down opposite to it, as is the common rule; the practice of making the staircase rise immediately opposite the entrance-door is objectionable. I have usually turned the stairs round the other way myself, and the only objection I have ever had raised was in the case of a pair of semi-detached houses, where the tenant told me his wife's friends "chaffed" her about the staircase being turned round the *wrong way*, and supposed it was because she was ashamed of her stair-carpets; and this opportunity for the display of the stair-carpet seems to be really one of the reasons for the common arrangement. On the other hand, I have more frequently found the tenants soon appreciated the advantages of the arrangement. In a town house, indeed, this seems absolutely the only relief from the stereotyped plan. There is one other plan of placing the staircase, in the centre of the house between the front and back rooms; but this involves top lighting, and means semi-darkness on the ground-floor, and is not desirable. A favourite arrangement in Queen Anne houses, where the stairs have to be arranged in the entrance opposite the door, is to turn the last four steps at right angles to staircase. This breaks the straight ladder-like flight in front of the door, but requires a wider hall than can usually be obtained. Having settled the position of the staircase in regard to the house, and the point on the ground-floor most convenient to rise from, the next question is the arrangement of the flights and landings, the first point to be kept in view being, of course, the main landing on the first floor, the object to be aimed at being to place this landing so that all the rooms on this floor open on to it without, in small houses such as we are speaking of, any corridors or passages. In a skilful plan there may be a good roomy entrance-hall on the ground-floor, where it is of use, and a very economically-disposed first-floor landing, though with the central top-lighted hall and staircase already mentioned this is not possible. Every one knows that long straight flights are to be avoided, eleven treads being about the extreme number in one flight, and also that square landings are desirable, though these should only be used sparingly, for too many square landings and short flights are more tiring and cumbersome, even, than over-long flights; but where this is impossible winders have to be introduced, and these need not necessarily interfere with the comfort of the stairs. There are winders *and* winders, and everything depends on the way in which these are arranged. It is common to find writers on this subject give a wholesome condemnation to winders, and to speak of them as makeshifts hardly to be tolerated. The most usual way is to form the square quarter-space, and then cut it up into three treads, by the easy process of an angle set-square of 30 and 60 degrees; this involves that the treads partake each of a triangular form, terminating in a point, and so are as dangerous and prolific of accident as can be, even though the treading-line, which is about 18 in. from the handrail, may be equal throughout. A portion of the staircase in Conduit-street leading up to the offices of the Association is a choice example of this arrangement. I do not know whether you recognise it; it is an example very well known as leading from this entrance-hall up to "the only lending-library in the profession"; it has a peculiar "refinement" in the width of the tread between the winders, being 12 in. instead of 10 in., like the others, and this, coming between the very narrow winders, makes it singularly awkward; but you can all judge by experience whether it is easy "going" or not. Now, with a well-hole of 12 in., as this has, it would surely be better to divide this among the winders than to give it to the one central step, and if arranged as on the plan shown, the "going" would have been comparatively good, for the rise and tread are easy in themselves; it is only the arrangement of the winders that makes it otherwise. Viollet-le-Duc, in his "How to Build a House," shows a stair with winders,—a very general practice in France. A very good example of a staircase plan, practically composed entirely of winders, has very kindly been lent to me by Mr. Lawrence Harvey, by whom it was recently designed for a house in Queen's Anne's Gate. I have dealt on this question of winders somewhat at length, as our practice in England is contrary to that more generally adopted on the Continent, and, I think, inferior. The objection to it, certainly, is an absence of landings for the aged and infirm to rest during the ascent; but I doubt whether they cannot stop almost equally well on any part of the stair as on a quarter-space landing, and unless the rooms are very lofty, the question really seldom arises at all. A continuous handrail with this arrangement is, of course, necessary, and this of itself helps to lead one in the direction of the stair. Another very important point to be remembered in the designing of the staircase is that it naturally acts as an upcast shaft to the house, and is, as it should be, its great ventilator. It is very essential, therefore, that it should have at least one outside wall with windows, for ventilation. Without this a house is always liable to a close and stuffy smell, and it must be remembered that where a w.c. or kitchen stairs are placed, as is often the case, under the principal stairs, special care must be taken, or the least smell from either will at once pervade the whole of the house. The aspect of the staircase windows can hardly be considered, as the stairs will naturally be placed where the aspect is least suitable for rooms. If you can get a sunny aspect, however, it is preferable. The landings of a staircase, where space will permit, should be wider than the stairs themselves, in order to allow of a stand of flowers or some china jars, or of a window-seat, which really would offer rest to the old and infirm using the stairs,

III. *Details.* — The rule for proportion of treads and risers need hardly be mentioned; but the aggregate of the tread and riser should always be about the same. Thus take 17 in. to be the recognised standard, then a riser of 7 in. would require a tread of 10 in., a rise of 6 in. one of 11 in., and so on. With regard to the width, this should never be less than 3 ft. in the clear, and if any of the reception-rooms are on the first-floor, the stairs should not be less than 4 ft. wide in the clear. Staircases in modern houses may be generally divided into those with well-holes, and without; the former are either newel staircases in which the handrails stop against the newels, or else have a continuous handrail,—probably the most dangerous arrangement where children are concerned, affording every facility for sliding down them and toppling over; where the rake becomes steeper, stairs without well-holes are either dog-legged staircases, or of the character shown in the example from Viollet-le-Duc, and these are generally used where space is limited. For internal domestic staircases wood is undoubtedly the best material. Stone may be used for the principal flight, its advantage being the quiet which is obtained. In Italy, and warmer climates than ours, stone staircases seem more appropriate. The soffit of wooden stairs is usually plastered, but the material is not really suitable, as the spring, which a good staircase should have to a slight extent, sooner or later cracks it at the junction of the flights with the landings. A deal panelled soffit would add but little to the cost, and, at the same time, gives character to the stair. The inclosure of the stairs by handrail and balusters needs no remark, beyond the fact that 2-in. balusters will always look better than 1 in., and that three to a step, as they used to be, is immeasurably superior to the two poor little inch-balusters generally seen. If only two are used, they should be of such a substance that there is not more than their own thickness between them. The wreathed mahogany handrail, with its elaborate scroll on the ground-floor, is very expensive, and should be perpetrated no longer; it has called forth many elaborate treatises on its setting-out, and many "staircase-hands" have made its perfection the aim of their lives; but beyond this there is little reason for adhering to it, except in the case where winders are introduced, where it becomes a necessity. A close or open string is very much a matter of taste and design, though perhaps the balance is in favour of an open string, and ladies will certainly be found generally to favour it, as having less corners difficult to sweep than a close one. A staircase should always look solid, with no stint of material, and while elaborate workmanship would be out of place on a small staircase such as I am speaking of, care should be taken that all the mouldings should be full and rather more massive than those in any other part of the house. The ladder-look of many stairs is, above all things, to be avoided. An old oak staircase, which has weathered almost black, with its heavy newels, handrail, and balusters, its solid oak steps, covered in the centre with a white drugget, has a quiet, homely, and inviting look, very different to the general toilsome-looking and uninviting ladders of the present day. With regard to its decoration, little need be said except, probably, the less the better. It is needless now to inveigh against block-marble paper, as architects, at any rate, have given up its use. A wooden-panelled dado, or a plain varnished and painted one, with a severe patterned paper, of not too dark a colour, is all that is required. Cornices on the landings are better omitted; but if a panelled soffit is adopted, a small cornice would probably finish this, and run round the landings also. Generally we may say, plain, honest, good construction is all that is required in a staircase. Ornamentation likely to arrest the attention is out of place; the same applying to the carpet, which should be quiet and unobtrusive in design, and indeed, if you are so fortunate as to be able to make the stairs of solid oak, nothing looks better on these than a clean white drugget.

Fire at a Builder's.—Last week a serious fire occurred on the premises of Messrs. Staines & Son, builders, Great Eastern-street, Shoreditch. The building, consisting of three floors, about 40 ft. by 20 ft., and used as workshops and stories, was nearly burnt out; and the stock comprised in the open yard in the rear severely damaged by fire. The building and contents were insured in the Phœnix Office.

ARCHITECTURAL ASSOCIATION.

At the ordinary fortnightly meeting of this Association on Friday, the 17th inst., Mr. Ernest C. Lee, President, in the chair, the following gentlemen were elected members, viz., Messrs. J. W. Cockrill, S. H. Maile, J. K. Cole, E. V. Grove, W. C. Jones, A. North, L. Littlewood, C. W. Jackson, S. A. Pentecost, A. E. Kingwell, W. Hodson, H. E. Trivett, E. G. Dawber, E. A. Mann, W. F. Sutton, S. P. Rees, F. P. Telfer, F. Rudkin, A. C. Wissenden, J. Clunie, S. A. Edwards, W. Weir, C. Mayne, H. Gordon, E. J. Pine, J. L. Robinson, W. J. Lander, P. E. Mantell, and G. W. Hatcher.

The announcement made from the chair that Mr. Quilter, past-president of the Association, had been elected District Surveyor for East Streatham, was received with applause.

Mr. Aston Webb then read a paper on "The Architectural Treatment of Small Staircases," the substance of which we print in preceding columns.

The Chairman, in opening the discussion, said that the paper was one of thorough practical interest; for houses could hardly be built without staircases, although he knew of an instance in which it had been done,—greatly to the inconvenience of the inmates, however. He agreed with almost everything that had been said by Mr. Aston Webb as to the planning, arrangement, and decoration of staircases, but he could not hold with him in the matter of the white drugget, which he thought had a very unsatisfactory appearance. He liked to see stairs carpeted, and carpeted for their whole width, instead of leaving the usual margins, which were generally of dirty paint. Mr. Webb had not made any special mention of the external staircases which were to be found in Caen, going up to the first floor of the buildings. On the road to Ardennes almost every other house had an external staircase, some of them dating from the sixteenth century, and others from the fourteenth. In these houses the entrance to the ground-floor rooms was beneath the external staircase. One very noted external staircase was the one at Syracuse, of which a sketch by Mr. Charles Eastlake had been published in the Architectural Association Sketch-book. Architecturally, such staircases admitted of very charming treatment indeed. No doubt most of the members of the Association were well acquainted with M. Viollet-le-Duc's chapter on "Escaliers." Prior to the fifteenth century, as Mr. Webb had stated, all staircases were practically in turrets or towers, as in the one given by Viollet-le-Duc of the old Louvre. There were numerous large staircases of that kind at Blois, and he presumed that almost every young architect who had travelled had measured up several of the old turret staircases of Normandy and other districts. He himself had met with a very interesting one in an old house in Orleans: it was a newel staircase, measuring not more than 3 ft. across, and was noteworthy on account of the manner in which the handrail and the newel interpenetrated. Mr. Webb had not particularly remarked the very small staircases which were to be found in many of the largest and most important houses built in the time of the Georges. At that period, people seemed to live almost exclusively for show. They had very grand reception-rooms, but directly they went up to their bedrooms they seemed to live in a hugger-mugger style. The staircase to the first-floor was very grand indeed, but the staircase to the upper floors was so very mean and small that any architect would be ashamed of putting it into a parsonage-house. The houses in Brook-street afforded an illustration of this. In an old country mansion dating from the Georgian period, which had lately been pulled down, the drawing-room was 40 ft. by 30 ft. by 19 ft. high, the dining-room being of similar proportions. The hall was 30 ft. by 20 ft., but the staircase that went out of it was only 3 ft. wide, with treads of 7½ in., and risers of 10½ in. This was an illustration of the manner in which people lived for outside show instead of for comfort and convenience. The staircases in the houses at Lancaster-gate seemed to bear out the views enunciated by Mr. Webb as to central staircases; for, except on quite bright days, gas had to be kept burning continually. A very fair illustration of the inconvenience of too many landings was afforded by the stairs up to the Esplanade at Richmond Hill, which consisted of an arrangement of four steps and a landing alternately repeated about ten times. If a person was at all in a hurry in ascending, he was most likely to fall up, and if in a hurry when descending, he was quite sure to fall down. One feature often found in the treatment of the angles of landings of staircases in old houses was, he thought, worth noting. Mr. Webb had stated that landings should be made fairly broad,—broader than the stairs themselves,—but he (the President) thought it would be a mistake to put seats on such landings; for it was very questionable whether any one would ever sit upon them. Flowers might, however, very well be placed there, and one good means of filling up the corners was adopted in the Georgian period, viz., angle cupboards with glazed doors, and containing shelves on which china was arranged. The effect of these was very charming.

Mr. Thomas Porter (who was very indistinctly heard) was understood to say that the subject was one of such an extensive character that he hardly knew what points to discuss. The paper was one which suggested a variety of practical considerations, some of which he would proceed to refer to. He thought there could be no rule laid down for the position of the staircase. The planning of houses was generally subject to the shape of the site and to other circumstances of a varied character, so that the position of the stairs must be left to the architect to determine in each individual case. He could not agree with the author of the paper in the *dictum* laid down that in small houses the staircase should be in as retired a position as possible. His own view would be to make it as handsome and as conspicuous a feature of the house as possible, consistent with the fitness of its surroundings. There was another reason why the staircase of a house should be in a conspicuous position, viz., that inasmuch as it was one of the secrets of planning a good staircase that the bedrooms should be entered direct from the landings,—or at least from lobbies opening on to the landings (so that there should be no waste room),—it was highly important that the staircase should be well lighted and ventilated, and the more conspicuous its position the more likely was it to fulfil these conditions. Windows were the best means of getting at once good light and ample ventilation. As to landings, nothing could be worse than having one step on them: it was sure to be a source of continual stumbling. As to the stairs themselves, there should be no discrepancy in the heights of the risers. A staircase in which this occurred was most unpleasant to those who used it, particularly when the top riser of a flight was of less height than that of those below it. If a comfortable staircase were needed, the risers must not be made too high or the treads too narrow. He did not think that Mr. Aston Webb's formula on that point was infallible. For instance, if a 9 in. tread were used, he (Mr. Porter) saw no reason why the riser should be 7 in. On the contrary, he thought that the height of the riser should never exceed 6 in. nor the treads, even in large houses, 11 in. As to the embellishment of small staircases, he thought it was usually the case that the ornamentation was far too elaborate and on too large and heavy a scale. Small staircases would not look well if fussy and overdone in their details. A 6 in. newel was all very well when the stairs were 4 ft. or 5 ft. wide, but in small houses, with stairs only 3 ft. 3 in. wide at the outside, 6 in. newels and 2 in. balusters would have an extremely awkward and heavy appearance. He advised the younger members of the profession not to take for granted all that was set forward as models for imitation, for he had lately seen a "prize design" for a small staircase in which the stairs were only 3 ft. wide, with 6 in. newels of a most elaborate character, while the balusters were of such dimensions that they must have been made out of 3 in. stuff; the material in which they were proposed to be executed was wood, but their forms were such as were proper to stone. The handrail was no less than 6 in. deep and 4 in. wide, and instead of being designed so that it could be laid hold of, it partook of the character of the coping of a Gothic gable. In regard to the wood used for balusters and other parts of staircases, it should be borne in mind that oak was capable of treatment with far finer mouldings than was the case with commoner woods. The height of the balusters and handrails was another important point. The rule laid down in books was that of the old-fashioned standard of allowing a height of 2 ft. 7 in. above the nosing of the step to the top of the handrail, but he ventured to recommend in small staircases a

height not exceeding 2 ft. 5 in.,—a dimension which was much more comfortable, especially to ladies, for 2 ft. 7 in. was a rather uncomfortable height for a handrail for even tallish men. A height of 2 ft. 5 in. was quite sufficient for safety. He had always adopted that rule except in the case of staircases where great grandeur was demanded. Balusters should be designed of such forms as were capable of being easily turned in a lathe. Any carving or other elaborate work on them was quite a mistake in small staircases. He did not quite see the objection to the plaster soffit, but he did think that a soffit of panelled woodwork to a small staircase would have a very "boxy" appearance. The difficulty of dealing with the cornices (if they must be had) of the ceilings of landings could easily be surmounted.

Mr. Cole A. Adams, in moving a vote of thanks to Mr. Aston Webb for his paper, illustrated on the blackboard some points touched upon in the paper, as did

Mr. S. Flint Clarkson, who, in seconding the motion, observed that one reason why a plaster soffit was objectionable in a staircase was that the latter was generally one of the most carefully-prepared pieces of woodwork in the house, being necessarily made out of seasoned material. The application of the wet plaster to it, however, had a tendency to dislocate the joinery. With regard to winders, he was generally disposed to agree with what had been said of them in the paper, and he might adduce, as an additional practical reason why winders were undesirable, the difficulty of covering them with stair-carpet. He did not go quite so far as Mr. Webb in disparaging the central position for the staircase; indeed, he thought that for a large town-house the central staircase was the one to be preferred, subject to the provision of a sufficiently large and adequately lighted well. Mr. Webb had given a very practical and useful paper on staircases, which very properly followed the excellent one on windows read by him two years ago.*

The motion having been carried,

Mr. Webb, in replying, said that the question of the drugget was a matter of taste, and with regard to it he still held to his own view as opposed to that of the President. With regard to the height of the handrail, he thought Mr. Porter was mistaken in advocating a height of only 2 ft. 5 in. A case had occurred (he thought at the Travellers' Club) where a man fell over a rather low handrail and was killed, whereupon there was serious talk of arraigning the architect for manslaughter.

The next meeting will be held on Friday, Jan. 7, 1881, when an account of the Association's last excursion will be read by Mr. C. R. Pink.

GARIBALDI ON THE DECLINE OF THE ITALIAN RACE.

WRITING a few days ago from Alessio, Garibaldi, in his usual plain and unvarnished style, expresses his opinion of the physical characteristics of his countrymen. The General's letter, which is addressed to the editor of the *Secolo*, of Milan, is as follows:—

"My dear Moneta,—I beg you to publish the following lines:—The *New York Herald*, speaking of Italian immigrants into the United States, says: 'Of all the emigrants coming here from Europe the most deformed, rickety, dirty, wretched, and thievish are the Italians.' Painful and humiliating assertions these, but true. Let us see what are the causes of such degradation. I will not refer to the excessive burdens of taxation which are ruining this poor nation, and driving it to despair. I will content myself with pointing to other blots which are less obvious, but which, like that just mentioned, disfigure our country. The Royal Cuirassiers must be picked men, the Royal Carabinieri must also be picked men, so must the soldiers of all arms of the service; so must the customs officers, the excisemen, the police, the municipal guards,—all these must be picked men. The monks, too, and the Jesuits receive no misshapen persons among them. What, then, remains to propagate the Italian race? The narrow-chested, the rickety, the scrofulous, the deformed, the lame, and all that sort of people. And now let those who rule the Italian nation tell me whether it is not inevitable that the Italian race should become degenerate.—Ever yours, G. GARIBALDI."

In drawing attention to this letter from Garibaldi, to be found in the daily papers, we desire to intimate that there are other reasons for the deformed, rickety, dirty, wretched, thievish inhabitants of Italy than those enumerated, namely, a total absence of proper sanitary arrangements in Italian towns and villages, from the palace to the hovel and room-tenement. Italy,—the land of sunshine, art, and song,—is a land of filth and vermin. There are marble palaces, art galleries, and blue skies, but neither sewers, drains, nor adequate scavenging. Hence, strangers who are tempted to visit the world-renowned cities pay a fearful penalty in risks from fever and certainty of mosquito stings, as also of punishment from other domestic torments. There is not one Italian city properly sewered, drained, and scavenged. The best hotels use cesspools, out of which pass foul gases and putrid fluids, to contaminate both air and water. Proper scavenging implies daily cleansing, not only of public streets and places, but of all back streets, lanes, alleys, yards, and tenement houses, with a removal of *excreta* and refuse at short intervals, never exceeding one week. As to proper sanitary works, a full supply of pure water is necessary, not merely for display in public fountains, but laid on by appropriate services to every occupied dwelling, however humble. The regulations of a Common Lodging House Act should be enforced in every slum and wretched room-tenement, and all the places unfit for human habitation should be sternly closed, and proper accommodation provided. When the improvements herein suggested have been adopted and are continuously carried out, there may be hope for the regeneration of Italy. Ironclads with 100-ton guns, Royal Cuirassiers, Royal Carabinieri, customs officers, excisemen, police, municipal guards, and Jesuits will avail Italy nothing in removing the fearful causes of disease and human distortion. When will statesmen learn that the greatness and strength of a nation are not alone in magnificent cities, palaces, ironclads, and standing armies, but in the health, comfort, and content of the people? The further lesson also requires to be learned, namely, that where the mass of the people are allowed to grovel in filth and misery, there can be no true security for property. A whiff of grape-shot will not cure such disease.

* See vol. xxxvi. (1878), pp. 1246, 1281.

THE MIDLAND RAILWAY AND ITS WORK.

Of our British railways, the Midland is the best known. It is not the largest, but it possibly penetrates into a wider reach of country than any other; and the boldness of its policy, the magnitude of its undertakings and extensions, and the substantial benefits it has conferred upon the travelling public, have given it the first place, possibly, in the estimation of the public. Springing from a very slight and small railway, it has become one of the four great lines in the kingdom. In its thirty-seventh year it has become so vast that its paid-up capital is over 67,000,000*l.*,—an immense sum to have been spent even in less than twoscore momentous years on railways, works, lines, and stock. But if a map of that great railway be looked at, it will be seen that it has a widely-reaching length of line. Its limbs are found far in the south-west, reaching down to Bournemouth, and stretching from Worcester to close upon the Welsh coast. St. Pancras is the central southern point, and direct north-west its line penetrates into the heart of the district whence it takes its name, gridironing it with branches, and sending out arteries to the east coast of Lincoln, to Manchester and Chester, and over to Liverpool, its trunk-line passing on to Normanton, and there severing, to make that wonderful extension to "merry Carlisle," which is justly ranked as one of the chief railway feats of the age, and again crossing to the west, to tap the great mineral resources of the rich Furness district. Except in the north-east, it may be said to have its lines spread in all parts of England, and it is the one railway which enters the six greatest towns and cities in the kingdom. Over 1,100 miles of line actually owned by itself its trains travel; and with lines leased, partly owned, and worked over, there is a total length over which Midland engines travel of 1,700 miles.

In these miles most varied scenery is enclosed. In its heart there is that of the well-wooded and undulating country from Buxton to Derby; the deep ravines, limestone rocks, and dense pine nooks round Matlock, with the rugged beauties of the Peak country, and its embowered halls; southward, it traverses Worcestershire, and down to the softer clime of Dorset; the waving wolds near Cheltenham, the ravines in Gloucester and Somerset, and the bleakness that bathes in the summer beauty of the south-west. No greater alternation with this could be found than that of the great northern extension to Carlisle up the Ribble valley, over and through Blea Moor into Garsdale, and over the great viaduct at Smardale, up the fine valley of the Eden, by castle-crowned Armathwaite, and on to Carlisle. Compared with this, the scenery round Carnforth and thence to the Lakes becomes tame; whilst that of the little Lune valley, and that around the most beautiful ruin of Kirkstall, and that in the Wharf valley, is as the river to the ocean. Alike through sylvan scenes, the dinginess of the "Black Country," the fat southern valleys, the homes of the worsted and woollen trades, the pleasure-grounds of the west, and the mountain fastnesses of the north, the Midland dashes; and whether it is the coalfields of Yorkshire, the ports of the west, the cotton and cloth districts, the lead-mining fields of Derbyshire, the hematite iron regions of Furness, or the multiform trades of the metropolis,—they are all tapped and toll taken of by this great company.

The Midland is now our chief coal-carrying railway, for every month it carries a million tons, a sixth part of which it conveys to the metropolis by rail; whilst of iron, lead, and other minerals there are proportionately large quantities taken over the line. From mineral traffic alone it has a monthly income of 150,000*l.*; from its vaster goods traffic, one of 249,000*l.*; from parcels, horses, &c., one of 23,500*l.*; and from live stock other than horses, one of 6,000*l.* Its passenger traffic is growing immense; every month it carries over two million passengers, of whom eleven-twelfths travel by its popular third-class, and from these two millions it receives 122,000*l.* monthly. In the total its monthly receipts are 540,000*l.*, the income of many a kingdom. Its working expenses are necessarily vast; for fuel for locomotive power alone it pays 14,000*l.* monthly; wages and salaries cost it in the same period 165,000*l.*; and for clothing for its officials it pays 2,000*l.* a month. Every month its trains travel two million miles; it owns 1,400 engines, a total rolling-stock of over 93,000, and it has the not inconsiderable stud of 2,735 horses. Its Parliamentary and law charges are from 1,000*l.* a month upwards; on the unsatisfactory item "compensation," in the same time, it expends 3,300*l.*; for rates and taxes it pays 14,000*l.* monthly, and finally it may be said that, after meeting all its working expenditure, it divides 250,000*l.* monthly amongst its 24,000 shareholders. This is the summary of what the Midland does, and it is no inconsiderable work; and when it is remembered that nominally the Midland Railway dates back only to 1844, and its earliest constituent branch only to six years earlier, it will be seen that the little branch from Derby has grown into a goodly line. It has not been all smooth-sailing, as those know who knew it in the dark days when "King" Hudson left the board of direction, or in those when the competition with the Great Northern was so severely felt that amalgamation with a greater company was thought of. Hence there is the greater credit to the Ellis and the Allports who have made the Midland; for it was not born great,—it has emphatically achieved greatness. The projection of the trunk-line from Bedford to London and from Settle to Carlisle are amongst the chief of the trophies it has won, and the works that have enfranchised it; and it is possible that in the future the Midland,—now the fourth in rank of British railways,—may in the north-east find a field to raise its status still higher.

BELFRY, SCHWABISCH GMÜND.

THE belfry of the Church of the Holy Cross at Schwabisch Gmünd is especially interesting, because it is a remarkable example of a cheap Mediæval structure, and shows us that it was not only in the costly and magnificent architectural building that the old architects excelled, but that they knew how to impart dignity to cheap and even temporary structures; for to the latter class this building undoubtedly belongs.

The magnificent Church of the Holy Cross occupies the site of an earlier building of the twelfth century. The present church was erected during the fourteenth and earlier part of the fifteenth century. An inscription on the doorway to the north choir aisle is as follows: "Anno Dom. 1351, ponebatur primus lapis pro fundamenta hujus chori XVI. kal. Augusti," and another inscription records the completion of the choir in 1370. The nave was commenced

about the same time that the choir was completed, and finished in the year 1410, when the whole was consecrated. The two towers of the former church were left standing between the nave and choir, but the arch which formerly connected them was removed in order to obtain a better view of the choir vaulting. This, however, weakened the towers, and on the night of Good Friday, in the year 1497, they fell to the ground with a crash, but fortunately no one was injured by the accident, although there were several people in the church at the time watching the Good Friday sepulchre.

The present belfry was erected immediately after this accident to hold the bells until a tower could be erected; but probably the events of the Reformation period, which shortly after intervened, prevented this being carried out, and thus, what was intended to be a mere temporary structure, has now existed for nearly 400 years. The walls are of considerable thickness, and the whole of the upper portion of the tower is composed of timber covered with highly-glazed tiles, disposed in patterns red, green, and yellow in colour.

There are four bells, of which the earliest dates from the middle of the thirteenth century. The other three are all dated, and were cast in the following years,—1456, 1515, and 1595.

THE NORTH LONDON HOSPITAL FOR CONSUMPTION, MOUNT VERNON, HAMPSTEAD.

This new hospital, of which we illustrate the north-eastern or entrance front and the plan, is now in course of erection. It will stand in its own large and well-wooded grounds, near the highest part of Hampstead, and will front to Frognal Rise with a nearly north-east aspect. The garden front consequently looks south-west, and commands splendid views of Middlesex and the Surrey hills. All the windows will catch the sun at some part of the day, and the greater part of them will be in sunshine almost all day long. The situation has been selected in order to carry out the views of those who advocate a dry and pure air in preference to a mild climate for the treatment of pulmonary complaints.

In plan the hospital is to be a compact rectangular structure, about 160 ft. long by 55 ft. 6 in. deep. It is intended for 110 patients. It has a very ample and light corridor, of fire-proof construction, running from end to end on each floor. The principal entrance is to be at the centre of the north-east front, and here an open and roomy main staircase rises through the principal floors, and adjoining it a service-staircase is carried from the basement to the attic floor, combined with which will be a lift for patients and general purposes.

The hospital is five stories high. The basement floor, owing to a rapid fall of the ground, is almost entirely above ground at the western end, and here is placed the out-patients' department, with surgery, dispensary, and ample waiting-rooms, the remainder of the basement being chiefly devoted to storage, cellarage, and heating apparatus.

On the main or ground floor are provided the rooms for administration. Here, for example, are the board-room, committee-room, and rooms for the secretary, matron, chaplain, physician, assistant medical officer, and clinical clerks; a receiving-room, visitors' room, two day-rooms for male and female patients respectively, and one or two small wards for special cases, complete the accommodation provided. There will be direct access to the garden and grounds from this floor.

The next two floors are devoted to the wards for patients, — one floor for women, the other floor for men. In the size and disposition of these wards such a hospital as this differs of necessity from a general hospital. The patients are here to be treated in wards of moderate size, as cheerful, airy, and pleasant as they can be made; and more home-like in their appearance than the great ward of an ordinary hospital. These will be heated by open fires, and their warmth and dryness will be contributed to by the fact that nearly all the external walls are built hollow. No ward is intended to receive more than eight beds and in some only four, and in others only two, beds will be placed. On each of these two floors a day-room, 35 ft. long, is provided, and here the patients will take their meals and may sit. On the sunny side of the building are also provided open arcades, communicating with the day-rooms and with the greater number of the wards. These will provide large and sheltered but airy balconies, in which patients may sit and enjoy the air, the sunshine, and the almost matchless view. There will be eight of these in all, four on each floor, and they will prove, it is hoped, a comfort and a solace to many of the inmates of the hospital. Nurses' rooms, Sisters' rooms, as well as bath-rooms, and other such appliances, will be provided on each floor.

The kitchen-offices, servants' dormitories, rooms for nurses off duty, and some of the household stores, will be provided for in the roomy attic story, which, thanks to the large space secured by the high-pitched roofs, is lofty as well as spacious. It is no novelty in modern buildings for the kitchen to occupy the attic story; but in many cases this arrangement could not be suitably attempted in a hospital. In the present instance, however, the convenience of the whole establishment will be best served by it, and the provisions will descend direct to the day-rooms of the patients, while the smell and heat of cooking will be kept entirely away from them.

In the sanitary arrangements, simplicity and thoroughness have been aimed at, and the ventilation of drains and isolation of water-supply have not been forgotten. The ventilation of each ward is carried on separately, an outlet-flue being provided alongside the smoke-flue in every case, air being introduced through one or more inlet ventilating-channels.

The building, which is of brick with stone dressings, and with tiled roofs, is being carried on in sections. The western section, the one first taken in hand, has been for some time complete in carcase, and the finishing of it is now far advanced. This comprises rather more than one-third of the entire building. The foundation-stone of the central section was laid in October by H.R.H. the Duke of Connaught; but this work will not be proceeded with till after the patients have been removed from an old house, occupying the site, and in which they are at present accommodated, into the new building.

The architect is Mr. T. Roger Smith, F.R.I.B.A., and the general contractors are Messrs. Higgs & Hill, of Lambeth.

DERWENT HALL, DERBYSHIRE.

The works at Derwent Hall, now the seat of his Grace the Duke of Norfolk, with the exception of a few minor details, were sufficiently completed in time for his Grace and guests to take up their residence there during the shooting season this year.

The old hall, situated near the interesting village of Derwent, was originally in the possession of the Balguy family, of Cheshire, and after some changes of ownership subsequently became the property of the Newdigate family, from whom the present Duke of Norfolk bought it for the purpose of a shooting-box. The accommodation afforded by the building proving, however, inadequate to the Duke's requirements, the old hall has made way for an almost entirely new block of buildings, of which the following description may prove of interest.

Entering by the old doorway (with the Balguy arms and the date 1672), on either side of the entrance-hall, which is hung with tapestry from Worksop Manor, two quaintly-carved doors open on the left to the Duke's study and servants' department respectively, two on the opposite side giving access to the old staircase and corridor in the right wing leading to the duchess's room and library, these rooms, with the entrance-hall and the duke's study before mentioned, being that part of the old building utilised in the present arrangement.

We may here mention that these rooms have been re-decorated and finished in a corresponding style with the rest of the work, in which every endeavour has been made to unite the character of an old English country-house with modern requirements. The right wing also includes the new dining-room, and, further on, the drawing-room, of which we give an interior view, showing a fine oak chimney-piece from Norton Hall. The continuation of the corridor connecting these rooms forms for the family a means of approach to the comfortable private chapel, the servants being provided with a separate entrance from the outside.

Ample bedroom accommodation also is provided, the rooms being panelled from floor to ceiling, and otherwise finished in a similar style to the ground floor.

Leaving this part of the house, the left wing contains butler's and housekeeper's rooms, kitchen and other offices, servants' hall, gamekeepers' mess-room, dairy, game and meat larders, and a new block of stables, with accommodation for eight horses in the stalls, two loose boxes, treble coach-house, and separate harness-rooms for his Grace and guests.

The works, including the chapel, have extended over a period of nearly four years. Messrs. Dennett & Co., of Whitehall, were the contractors for the Early English chapel and a part of the house, the remainder of the work having been done without a contract, under the sole management of the architects, Messrs. J. A. Hansom & Son, of Alfred-place West, South Kensington, Mr. J. Firth being the clerk of works.

The stone, both for ordinary masonry and dressings, was at first obtained from Moscar, at considerable expenditure; but latterly a quarry on the estate has been opened out.

The house is fitted up throughout with electric bells, by Messrs. Edmundson & Co., of Westminster. The general work, including most of the oak panelling, has been done by Messrs. Dealy & Horner, of Sheffield; the carving and the remainder of the panelling, including that in our view, being by Messrs. Farmer & Brindley. The cost of the works up to the present time is nearly 30,000*l*.

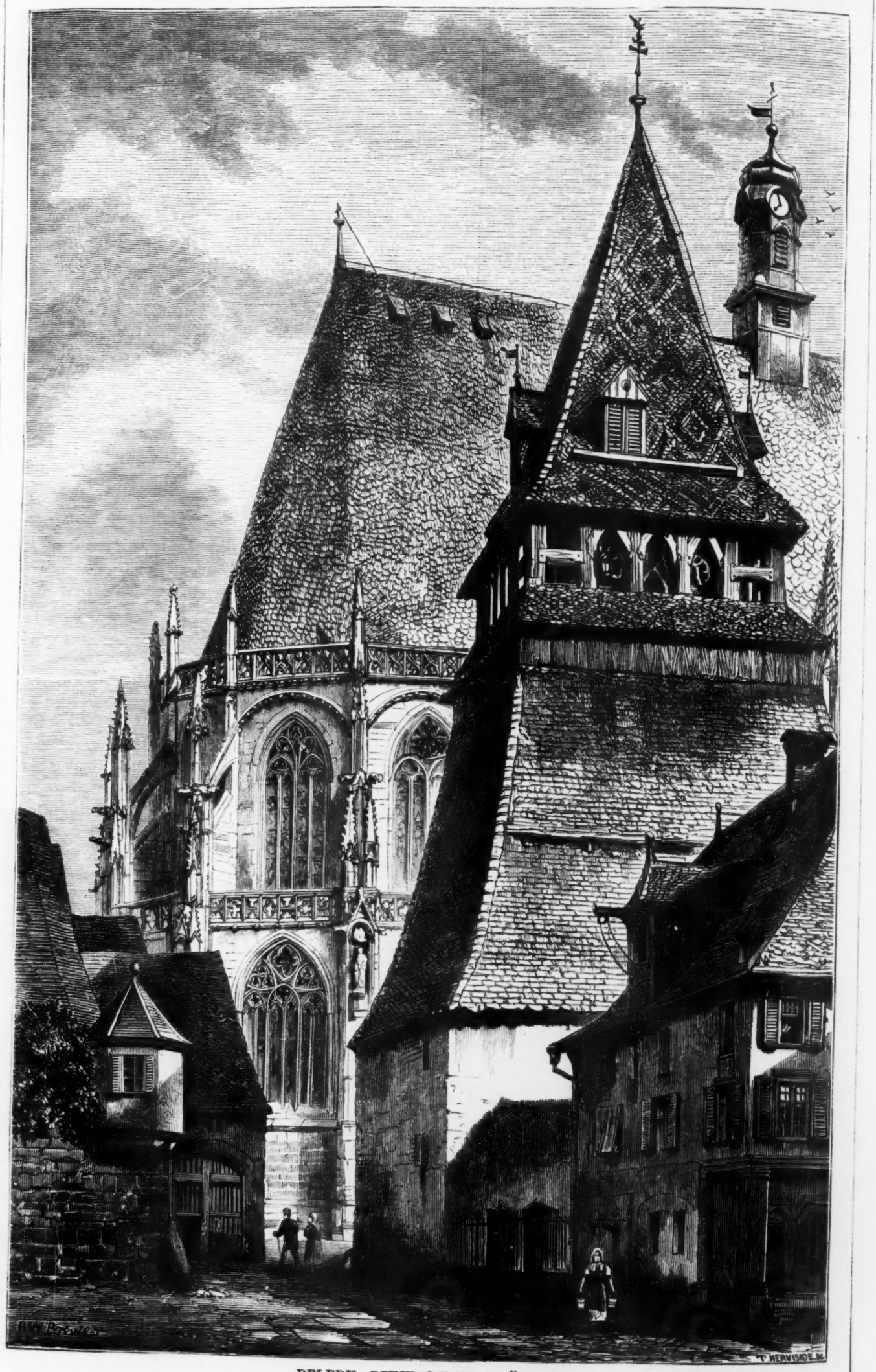
The old building has been enlarged, altered, and pulled about a good deal at different times, to suit different tastes and requirements; but every effort has been made to retain the genuine old parts wherever character was displayed and the stability of the buildings allowed it. Unfortunately, however, the Hall had, under previous owners, been dismantled of many quaint accessories, in the way of wainscot panelling inside and lead-work outside, while the plasterer had had only too free a run of the house.

The stained glass in the chapel, and the door and shutter furniture, which is of iron treated with Professor Barff's process of oxidisation, were supplied by Messrs. Hardman & Co. We believe this is the first time of Professor Barff's treatment being used for a similar purpose, and it harmonises admirably with the oak doors and panelling. We propose shortly to give a view of the exterior.

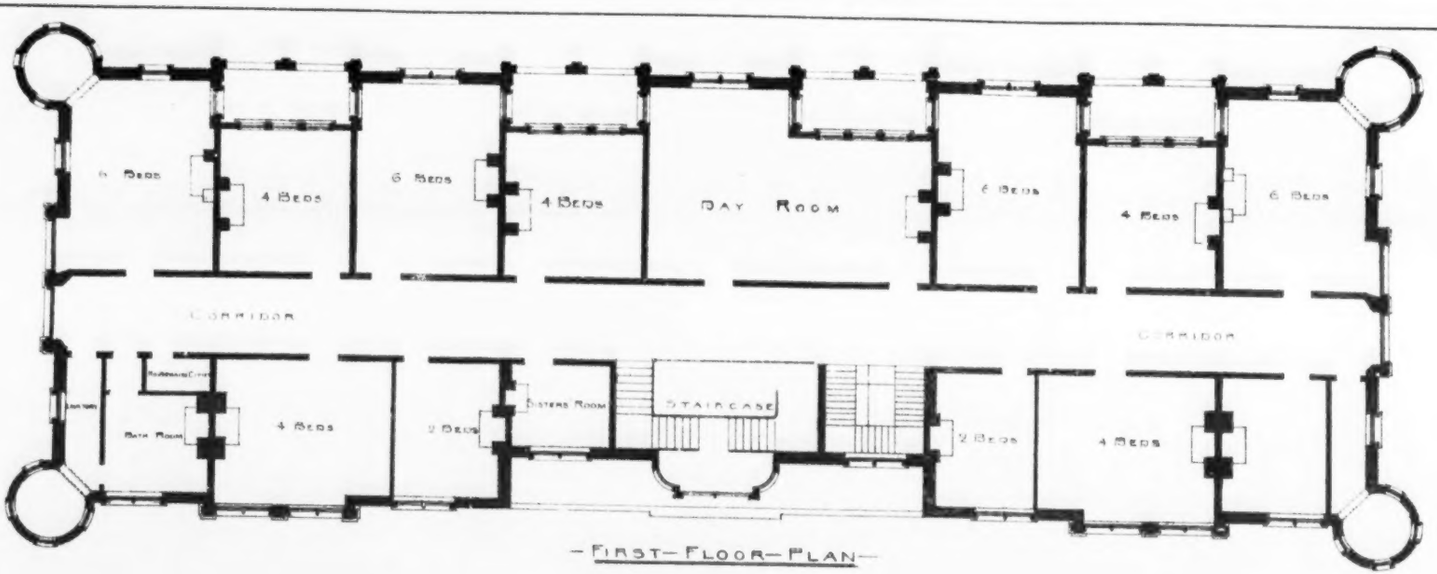
THE SCHUMANN MONUMENT, BONN.

When, in the August of 1873, the most eminent German and foreign artists met within the walls of the pleasant university town on the Rhine to do honour to the memory of Robert Schumann by a musical festival, this was done also with a desire to erect a suitable monument to the composer in his last resting-place, the cemetery of Bonn, the proceeds of the meeting to supply the means for its erection. A local committee was appointed at the time, and this body, after careful consideration, commissioned the sculptor, Herr A. Donndorf, to execute the work. Professor Donndorf is well known by his Luther Monument at Worms, the equestrian statue of Karl August at Weimar, the Freiligrath Monument, and other equally meritorious creations. The monument, of which we give an illustration, and which has been erected in the Friedhof of Bonn, is entirely of white Carrara marble, and was executed at Carrara under the personal superintendence of the sculptor. It was unveiled last May.

In keeping with the place for which it was intended, the sculptor has imparted to his work a solemn, elevated character. On a broad base rises a powerful square socle, which supports the monumental stone, tapering somewhat towards the top, and crowned by a moulded coping with acroteria. Its front bears a faithful medallion portrait of Schumann, surrounded by branches of oak, roses, and laurels, and supported by a rising swan with outspread wings; below, simply his name, Robert Schumann. At the foot of the socle the master's muse is seated, to which the sculptor has given, with true poetic and historical instinct, the youthful features of Klara Wieck, the noble wife and congenial life-companion of the great composer. It is a charming, thoroughly German figure, this muse, a type of sweet, ideal womanhood, of poetic temperament and devoted inspiration. Draped in modest folds, the expressive face turned upwards to the right, she rests her left hand, the fingers of which enclose a partly-opened roll of music, upon the lyre, while the right, resting in her lap, holds a laurel wreath. The ideal



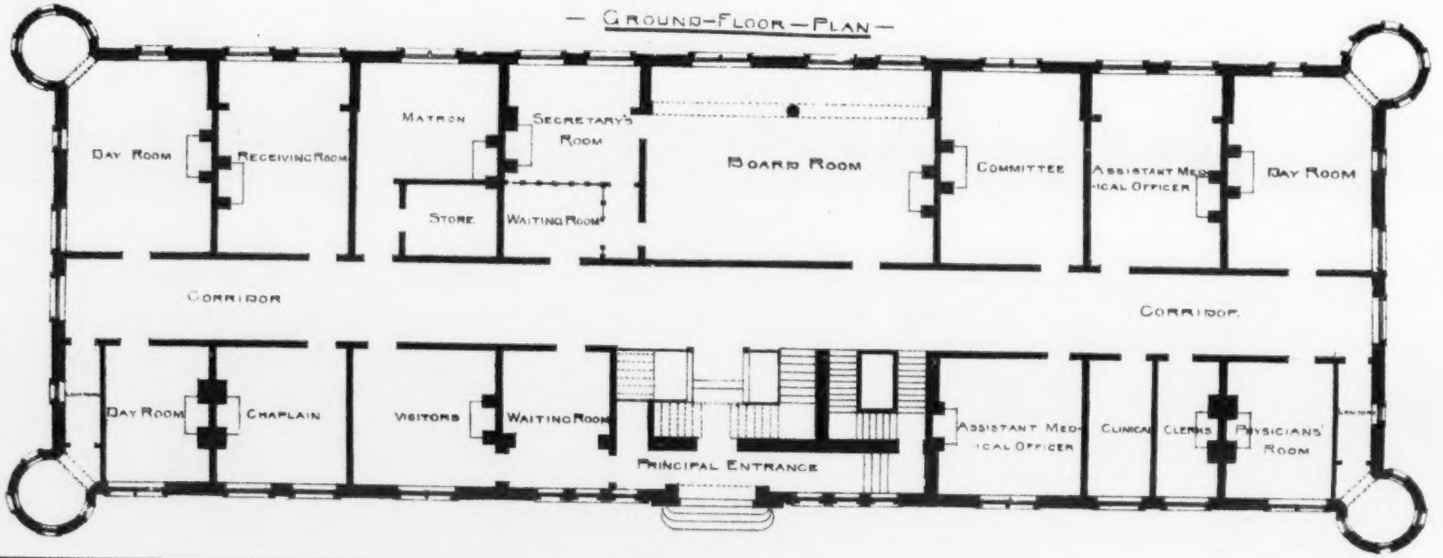
BELFRY, SCHWABISCH GMÜND.



— First-Floor-Plan —

Scale about 22 ft. to 1 in.

— Ground-Floor-Plan —



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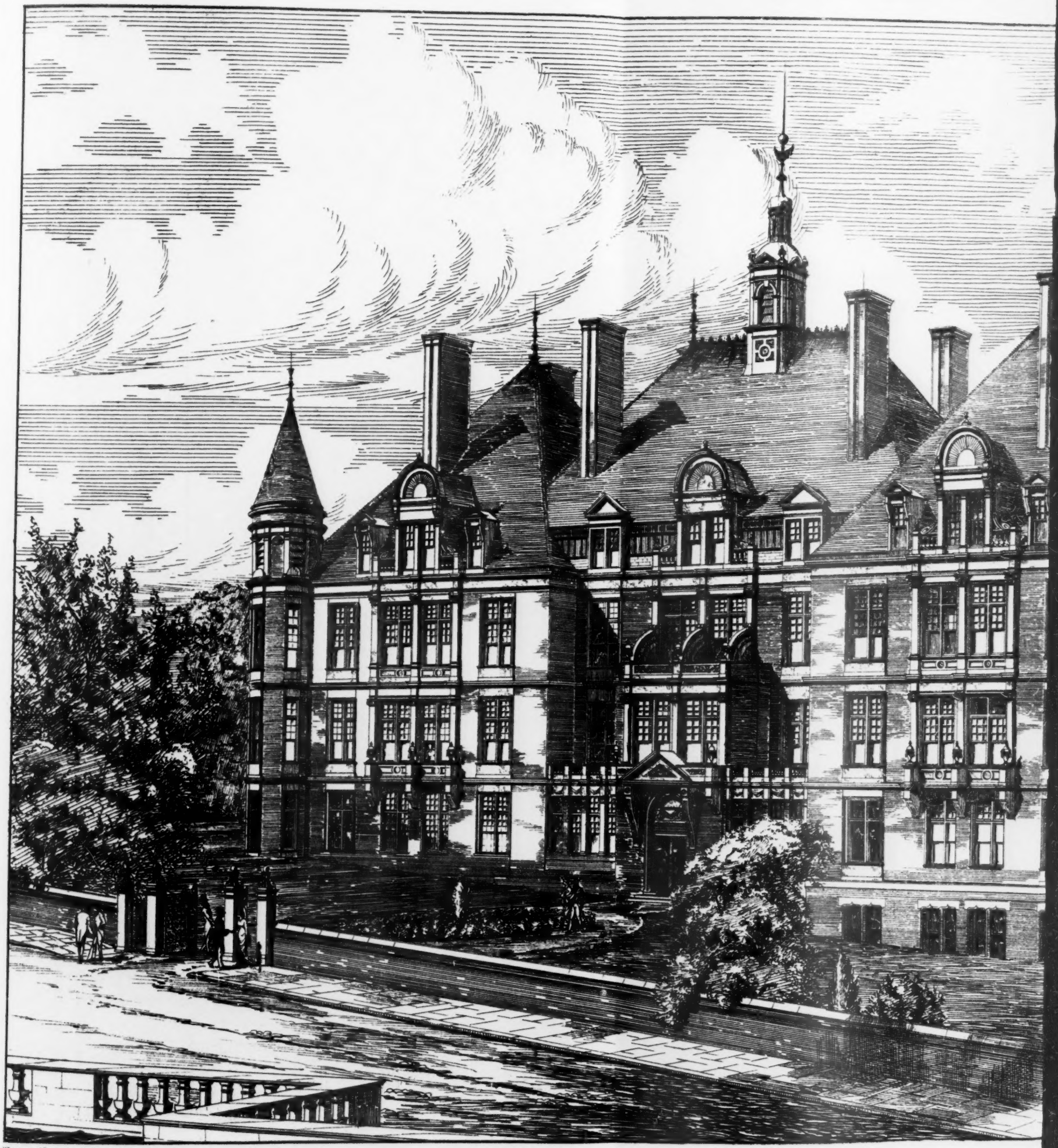
CONSUMPTION HOSPITAL, HAMPSTEAD.

William Kemp, Printers, 7 Queen St.



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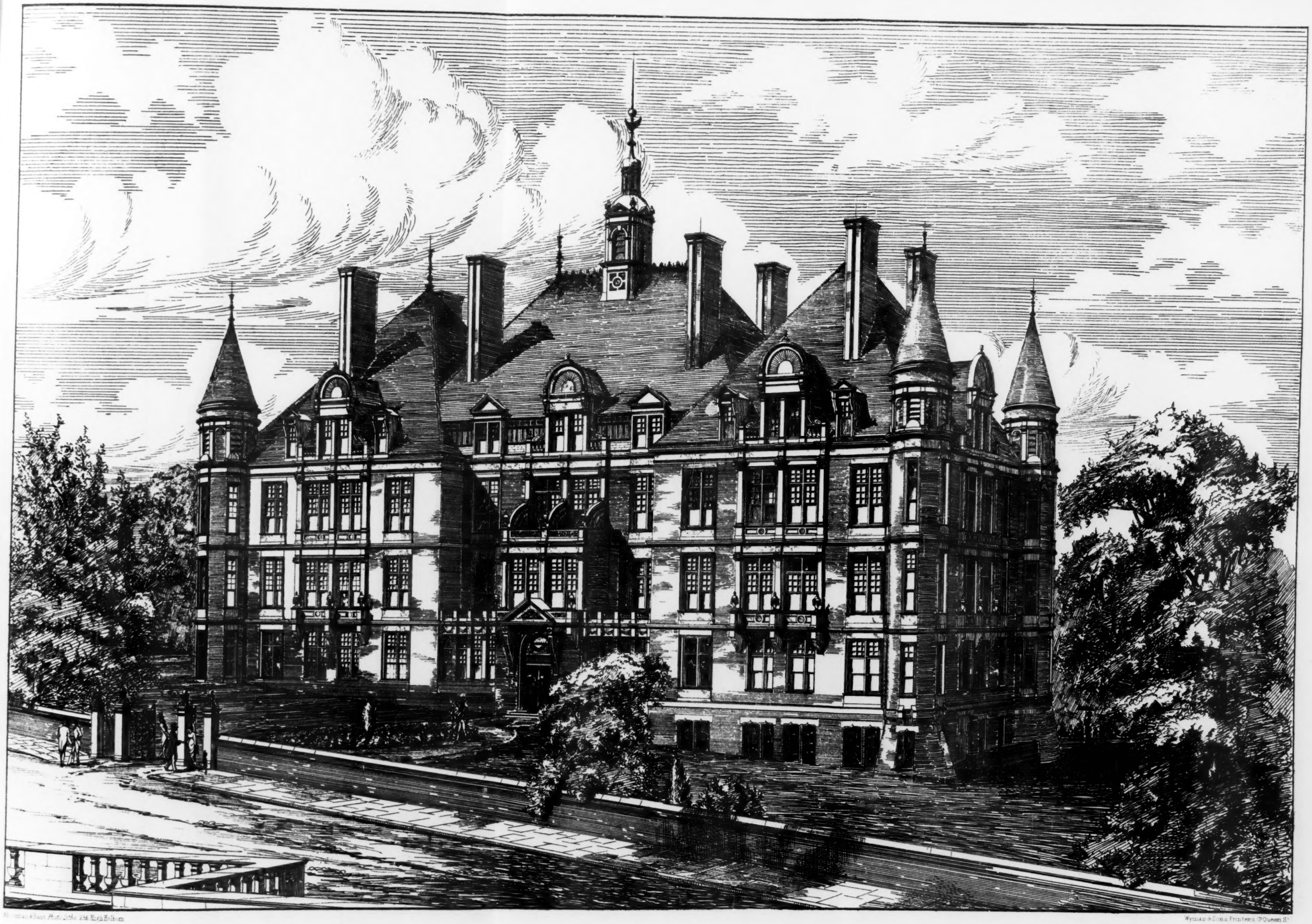
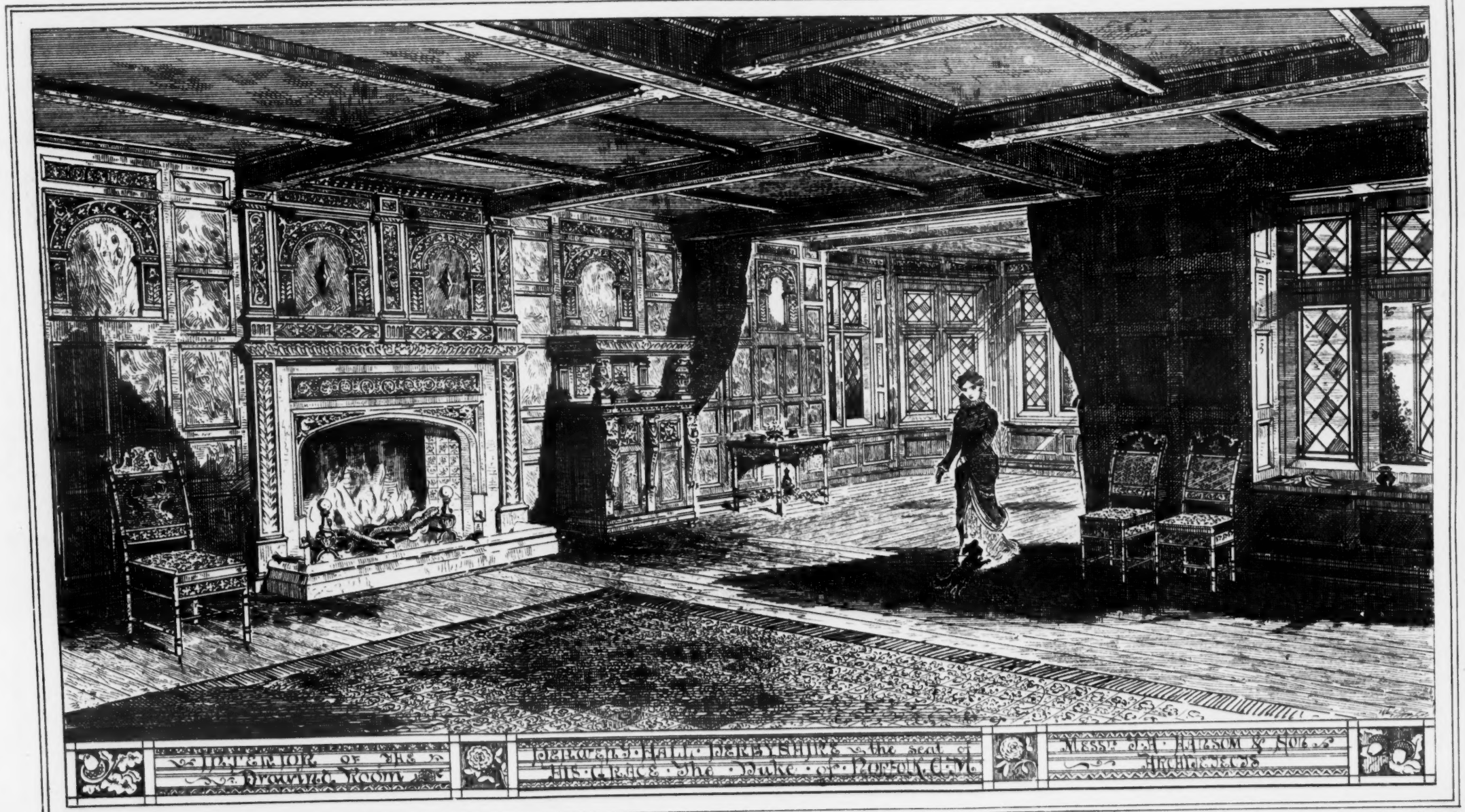
THE NORTH LONDON HOSPITAL FOR CONSUMPTION, MOUNT VERNON, HAMPSTEAD.—Mr. T



THE NORTH LONDON HOSPITAL FOR CONSUMPTION, MOUNT VERNON, HAMPSTEAD.—Mr. T. Roger Smith, Architect.


INTERIOR OF THE
DRAWING ROOM
DERWENT HALL, DERBYSHIRE, the seat of
HIS GRACE THE DUKE OF NORFOLK, K.M.
MESSRS. J. T. MASON & SON,
ARCHITECTS

Whiteman & Bass *Photo-Litho* 236 High Holborn

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THE MONUMENT TO ROBERT SCHUMANN, BONN.—PROFESSOR A. DONNDORF, SCULPTOR.

importance of the special muse of the composer could not have been more convincingly expressed. On either side of the muse are seated, on separate pedestals, two genii,—the singing Psyche and the fiddling Amor.

The monument is about 13 ft. high, and has a breadth of 6 ft. 6 in. All the figures are in a much lighter marble than the architectonic parts, and are somewhat above life-size, so that in the open they have the effect of natural proportions. The head of Schumann not only forms the centre of attraction, but also the lightest part of the monument, marble of the most excellent quality having been selected for it. The total cost of erecting the monument is 1,250*l.*

A PLEA FOR VENTILATION.

THE discussion upon Mr. E. C. Robins's paper upon "Sanitary Science in its Relation to Civil Architecture," on the 29th ult., was adjourned, to be resumed on the 17th of January next. In the meantime, public attention will be absorbed by all-engrossing politics, and unless, Sir, your influence can be exerted, the good which might have resulted from Mr. Robins's comprehensive paper will to some extent be lost.

If you will allow me space to comment upon the observations of the several speakers at the discussion in question, I will conclude with an endeavour to fix the *onus* for neglected ventilation upon the right shoulders.

My remarks shall be strictly confined to ventilation combined with warming, since these should never be severed; and, moreover, my practical experience has been chiefly confined to these branches of sanitary science.

The observations made by Professor Corfield, who commenced the discussion, had reference chiefly to sites and drainage, the ventilation of sewers, &c., but did not touch upon the ventilation of dwelling-houses.

Mr. E. R. Robson, who followed, made several sound and practical observations, and rightly insisted that what the architect has to do is to follow natural laws in the main. He advocated the provision in all houses of efficient warmth and ventilation to the corridors and staircases; forming reservoirs, in fact, of fresh warm air outside the rooms.

It would be no valid objection to this view to suggest that, by so doing, in London houses especially, the heat and odours of the kitchens and basement offices would be attracted upwards. Such a result can and ought to be rendered impossible by the efficient ventilation of those departments of essential work.

I cannot, however, agree with Mr. Robson in his preference for the American steam-heating system, which, as pointed out by Capt. Douglas Galton, C.B., does not, like the low-pressure hot-water system, admit of easy regulation to meet the ever-varying temperature of our climate.

Neither can I endorse Mr. Robson's condemnation of the principle of warming the fresh air by contact with low-pressure hot-water pipes in basement chambers, and distributing it, in large quantity, moderately heated, to the several rooms of a school or other building. It may well be that many of the earlier constructions upon this principle with which Mr. Robson is acquainted have had their basement chambers too small to admit of periodical cleansing, or even for the reception of sufficient air to be warmed and passed on to the several rooms. That such fresh-air channels should speedily become foul and dirty, and affect the salubrity of the air, cannot be surprising, while others, sufficiently large for workmen to pass from end to end to cleanse and lime-white their interiors, may be referred to without hesitation as the very best means of warming and ventilating rooms designed for the reception of large numbers of persons. Such are those of the Museum of Comparative Anatomy and the Selwyn Divinity Schools at Cambridge.

The inequality of temperature in large rooms warmed by open fires, to which Mr. Robson adverted, ought not to arise where the best kind of warm-air ventilating-grates are used.

Of these it may be safely asserted that they maintain a temperature varying not more than 2° between the most opposite points, premising, of course, that the size of the grate (fire) has been judiciously chosen, and no extraordinary amount of cooling surface nor deep recess or bay occurs to make the spot in question altogether exceptional. It is to be hoped that the members of the Institute will accept Mr. Robson's invitation to inspect and judge of the two school buildings to which he referred, the one warmed by the "Hygiastic Grates," and the other by the "American Steam-heating System." If the latter, by radiation or convection, shall efficiently warm the air of the rooms, while the Whitehurst-Tobin principle of cold-air supply shall impart the needful freshness, without cold draughts, its success will make the deeper impression from the fact that theoretically it is in opposition to the views of our first authorities.*

Captain Douglas Galton, C.B., bore testimony to the greater success of American architects in dealing with ventilation than obtains in England, attributing this result to the greater scope allowed them for improvements. He referred especially to Dr. Hall's Presbyterian Church, and to the theatre in Madison-square, New York, but beyond the statement that the ventilation was effected partly by means of propulsion and partly by extraction, no practical suggestions were afforded. Mr. Ewan Christian cordially endorsed the eulogium of Captain Douglas Galton upon the admirable ventilation of Dr. Hall's Church, but if he brought away with him any definite conception of the mode of its accomplishment he failed to convey it to the anxious minds of the junior members of the profession, whose ears were open for its reception. Indeed, these young men, who doubtless made mental notes of the scientific works they were recommended to study by one of the earlier speakers, another F.R.I.B.A., must have felt their ardour in the pursuit of good ventilation considerably damped, when their highly-respected senior wound up his remarks by stating that "he had tried many plans [of ventilation], but always found all the holes stopped up within a month or so. Nothing was better than a roaring fire and an open window."

Would it be unfair to ask Mr. Christian whether the fact stated as to the "many plans" and the "stopped holes" proves anything more than that want of knowledge which hinders the use of inlets and outlets for air, where they would inevitably act as desired? I fancy too many architects would delight in ridding themselves of all enthusiastic advocates for scientific ventilation by placing them within the range of "open window" and "roaring fire."

Mr. G. J. Symons, F.M.S., drew attention to the system of a Glasgow firm for the ventilation of large rooms by means of two large iron vessels alternately rising and falling in the roof space for the extraction of vitiated air. This system would appear to require steam or other power. There are many efficient modes of extraction where power is available, but the remarks in the present paper chiefly refer to ordinary buildings where such is not the case.

Professor Ayrton's condemnation of the highly-heated American stoves accords with the established preferences of Englishmen. The statement that carbonic acid gas passes easily through heated wrought iron will be a surprise to many persons, and it would at least be useful to know to what temperature the iron may reach before attaining this objectionable result.

Lieut.-Colonel Prendergast, who last addressed the meeting, referred especially to the "brand new" barracks at Knightsbridge, where he appears to imply that the proverbial result has followed the employment of "too many cooks"! "The admirable grates devised by Captain Galton have been rendered nugatory by ventilating engineers on the one hand, and doctors on the other"!

But the remarks of Lieut.-Colonel Prendergast are not sufficiently precise or explicit to admit of criticism, while they induce a strong desire for further information; and this we must hope to obtain.

And now, sir, for the promise, illustration, and reference, given in the second paragraph of this paper.

When, several years ago, the plans for the Foreign Offices were in course of preparation, I determined to induce, if possible, some consideration for poor, neglected "ventilation" at the hands of the distinguished architect, Mr. (afterwards Sir) George Gilbert Scott, and I approached him armed with a letter of introduction from his brother. I was courteously,—not to say kindly,—received; the subject was admitted to be an important one; and I was requested to obtain an interview with the then First Commissioner of Works, the Right Hon. Wm. Cowper.

My opening visit with the First Commissioner appeared, to my inexperience, a very promising one; and I returned to Mr. Gilbert Scott with the message that Mr. Cowper would be very pleased that Mr. Scott should go into the question with me in order that something might be done.

It was not easy for a mere "projector of ventilation" to command ready access to two such distinguished men, and I had a weary time of it, and several unproductive calls upon Mr. Gilbert Scott, before I was informed that the architect had no money for ventilation, and that the First Commissioner should start by providing a further 10,000*l.* (!) to enable the architect to entertain the question seriously. At length, when I succeeded in obtaining another interview with the First Commissioner, I was doomed to hear that more money was out of the question, and I was asked, "Could ventilation really be so essential for such large and lofty rooms?" It was in vain that I argued that large rooms were usually built for large numbers of persons, and that even when occupied by few persons only, stuffiness of atmosphere was merely a question of time, and inevitable, sooner or later, in the absence of means for exchanging the air. I next tried the "*argumentum ad hominem*," by reminding the Right Hon. First Commissioner of his own highly-interesting paper upon this very subject of ventilation at a recent popular Reading; and I was rewarded by a smile, and some allusion to autumnal leisure, and the duty of contributing to the edification of the people.

I have known it to be maintained by many architects that there is no desire for ventilation on the part of the public, their clients, and hence that they are unwilling to pay for it. But surely it should be the province of the architect to insist upon its provision, in view of the overwhelming evidence of its necessity afforded by the researches of scientific men. The principles which underlie the construction of chimneys which shall not smoke, of ventilating-flues which shall pass their currents as desired, of drains which shall not poison their surroundings, of damp walls and basements which shall be conspicuous by their absence, are very much of one order, and may be understood by any one who brings a very little science, experience, and common sense to bear upon them. They partake perhaps too much of the practical to be popular with the æsthetic; but architects who neglect them after all the aids afforded, as was well suggested by Professor Corfield, will assuredly be left in the rear of progress; for the time must come when they, and they alone, will be held responsible for the neglect of this and all other branches of sanitary science.

D. O. BOYD.

* Hood's "Treatise," 5th edition, 1879, page 377; Parkes's "Practical Hygiene," by De Chaumont, 5th edition, 1878, page 149.

A CHRISTMAS VISION.

ONE night I chanced to pass the time
With Christmas tales, in prose and rhyme,
Of ghosts and phantoms eerie,
And then to "shop" for change I turn'd
And read how limes should not be burn'd,
Till brain and eye grew weary.

I read how great the works of old,
How style did newer style unfold,
How Art from Nature grew:
How, first inspired by her grand skill,
Man needed, reason'd, built,—until
His earth was dress'd anew.

I read till past that "witching hour"
When spirits may assert their power
To visit earth again.
At length I laid the volume down,
I lit my pipe, put on my gown,
And fell in musing strain.

The wreathing smoke did upward curl
In many a circling, wavy twirl,
And from its shade there grew
A form impalpable, though near,
Whose shadowy presence grew more clear
The more the smoke I blew.

His lustrous eyes, his olive cheek,
His raven hair, his all, bespeak
Him born in foreign clime;
His massive head and lofty brow
Denote the intellect which now
Defies the power of Time.

Aghast I gazed in trembling awe,
When at his side arise I saw
A form far less imposing;
The latter's brow is more serene,
His dim eyes lack those glances keen,
The mind's own fire disclosing.

But yet they did engage, methought,
In wordy war, for oft I caught
The arms outstretch'd, and guess'd
That he who first appear'd did chide
His fellow's want of proper pride
In arts which he profess'd.

Whereat he of the modern school
With twitching mouth, demeanour cool,
Look'd as though he'd say,
With you *in toto* I agree,
At least—that is, in theory:
In practice 'twill not pay.

Ere long less stupefied I grew,
And seem'd to understand the two
Disputed as to Art;
The ancient's accents fluent roll'd,
Mellow, rapid, deep, and bold,
As pouring from his heart.

"O Friend," he cried, "art thou content
To copy merely what was lent
As precept and example?
Have minds become so barren now,
That e'en Invention's needy plough
But turns the ancient sample?"

"No," quoth the other; "but you see
The public are æsthetically
Inclined, and swear by you;
True art but lived in days of yore,
They say, and praise the copy more
The more the copy's true."

"The public—bah! And what know they?
Unletter'd, rude, and, sooth to say,
Aye clamouring for the moon!
We work'd for art, and when we caught
A Heaven-inspired notion sought
To give it life full soon,

All careless whether those around
Contemn'd or flatter'd, if we found
New beauties spring to life.
O Friend, our all was in our art,
'Twas of our very soul a part:
We knew not jealous strife."

"But, Sir," the Modern next replied,
"From then to now is period wide;
Permit me, too, to show
The public is to us what you
But found in patrons, though 'tis true
They both but little know.

You'd but to please a tyrant rude,
While we must please the multitude,
From pot-house to the Throne:
For, strange to say, 'midst all our cares,
We all of other men's affairs
Know more than of our own!

And had I follow'd when on earth
My art for art's intrinsic worth
I had been in a fix
When friendly Charon ask'd for toll
To row my disembodied soul
In comfort o'er the Styx."

"Unhappy man! and canst thou now
Scoff lightly at thy art? Didst thou
On earth so plainly mock it?"
"Nay," quoth the Modern; "then, I grant,
I used the necessary cant,
Nor wantonly did shock it;

For had I striven 'gainst the tide
Of taste my hobby-horse to ride,
Without it was the rage,
I had been call'd a dunce, a prig,
An ass, who, with conceit swell'd big,
Did strive to guide the age."

"Alas, alas!" the Ancient cried;
"Alas, alas! that thus the bride
And lover true should part!
That she should go to Mammon's bed!
That he should sacrifice for bread
His duty to his art!

While sciences and laws progress,
How is't the sister arts do less
Than keep their ancient lines?
To-day's are not the same demands
Which fired the brain and nerved the hands
That raised Athenian shrines!

Be not withheld,"——The spirit here
Stretch'd forth his arm. To plainer hear
I forward lean'd, and broke
The vapoury cloud which hung around,
When, lo! my vision had, I found,
Consisted all of smoke!

HERBERT.

The Liverpool Land and House Owners' Association held its twenty-first annual meeting on the 17th inst. The report stated that during the past year the council had sent a memorial to the Right Hon. R. A. Cross, M.P., suggesting that a Bill might be introduced into Parliament in favour of a national water supply, and against exceptional legislation for London; also a memorial to the City Council urging postponement in carrying out the Vyrnwy water scheme. The proposal of the City Council to erect 2,560 lamps in courts and passages, at an expense of 15,800*l*., to be paid by owners of property, was protested against. After referring to the opposition of the council to the second Nash-grove scheme for building artisans' dwellings, the report expressed the hope that the last had been heard of "four and five-decker houses" [dwellings in flats, we suppose], and that the land would be disposed of in the open market in the usual way. The council had suggested to the City Council that they should apply to Parliament for power to take down the whole property in the old parts of the city, that wide roads might be laid out for properties of every class to be built to the fronts of them. It was believed this would have the effect of reducing the high death-rate. The report was adopted.

ENGINEERING WORKS AT HOME AND ABROAD.

CIVIL AND MECHANICAL ENGINEERS' SOCIETY.

MR. H. ELLIS HILL, A.-M. Inst. C.E., in the course of the address delivered by him as President of this Society at the opening meeting of Session 1880-81, commenced by referring with satisfaction to the fact that the Society, which has now been in existence for twenty years, has recently acquired offices and a meeting-room of its own in Westminster Chambers. He next proceeded to review the progress made in engineering works during the past year, specially mentioning and briefly describing the Royal Albert Docks at North Woolwich, recently opened, and which, it may be noted, consist of a main floating-dock of 75 acres area, with an entrance-basin of 9 acres. The entrance lock is 800 ft. long and 80 ft. wide, with 30 ft. depth of water over the cills. The main dock is a mile and a quarter long and 490 ft. wide, the total length of dock walling being three miles and a half. As we pointed out in our description of the works three years ago,* the dock-wall is of concrete (500,000 cubic yards being used, requiring 80,000 tons of Portland cement). This work, perhaps the most gigantic of its kind, was cited by Mr. Hill as affording evidence of the great value of concrete in such constructions, on account of its strength, cheapness, and adaptability, and as having almost revolutionised the practice of the civil engineer in such works. Another fine example of the use of concrete is to be seen in the Dock Extension works at Chatham. Amongst other works completed during the past year are the landing pier and breakwater at Douglas, Isle of Man, where, again, the material used was concrete, with the result that the works have been constructed at probably a less cost than any kindred works of similar magnitude in the country. The necessity for adequate dock accommodation for ocean-going steamers is making greater demands upon the engineer, in consequence of the continually increasing size of those vessels. Steamers of 5,000 tons burden, 500 ft. long and 26 ft. draught, are now traversing the ocean, and vessels of 8,000 tons and 10,000 tons seem likely to become common. Alluding to the proposed Panama Canal, Mr. Hill paid a warm tribute to the energy and genius of M. de Lesseps, and stated that in connexion with the works there would be constructed a flood storage reservoir having a capacity of 1,000,000,000 cubic mètres. The dam for forming this reservoir would be 147 ft. high and 787 ft. wide at the crest, and would require 26,000,000 cubic yards of material. The total amount of excavation for the canal was estimated at 100,000,000 cubic yards, about one-half being in rock. Owing to the peculiarity of tidal change, a basin with three lock chambers would be necessary at the Panama end, the rise of tide being from 7½ in. to 19 in. at one end, and from 8 ft. to 21 ft. 3 in. at the other end of the canal. As a maritime nation, it could not be said that England was yet well supplied with accommodation for shipping. Our shores were proverbially dangerous, and harbours of refuge were few and far between. The railway works completed during the year include the St. Gothard Tunnel, and, amongst those nearly completed is the Manchester Central Station, having a roof of 210 ft. span and 550 ft. long, and in which the weight of ironwork used is 2,400 tons. The lamentable failure of the Tay Bridge was referred to as showing the necessity, not only for careful consideration of the design and proportionment of parts to work to be done, but also, — and of not less importance, — the obtaining of good material and workmanship. With regard to the future prospects of the engineering profession, Mr. Hill said he did not share the gloomy view held by many, that in this country engineering is worked out. Of course, with regard to railways, not many (if any) large trunk lines would be required, but there was still much work to be done in the way of providing branch lines. As to street-tramways, there was no reason why they should not be very greatly extended, and horse draught-power largely if not entirely superseded by steam or other motive power. The problem of dispensing with animals for draught-power had not yet been entirely solved, however, for the crude expedient, now being tried in some of the Northern towns, of coupling an unwieldy and cumbersome engine and boiler to an ordinary tram-car could not be considered a success. There was much room for ingenuity in devising a simple and easily-managed mechanical motor for street tramways. With regard to sewerage and drainage works, Mr. Hill observed that fame and fortune had still to be won by sanitary engineers in devising a system of dealing with sewage which should be effectual and generally applicable. Gas and water engineers, electricians, and representatives of other branches of the engineering profession had also much work before them. Discussing the question of transferring the management of gas and waterworks to municipalities instead of leaving such matters to private enterprise, Mr. Hill doubted the advisability of the change, on the grounds, amongst others adduced, that there would be a less direct incentive to the obtainment of commodities of good quality (whether water or gas) for the sake of the custom, or to the attainment of cheap distribution for the sake of the profit, and the consequence would be, in Mr. Hill's opinion, that the consumers would suffer. In considering the work of the Civil and Mechanical Engineers' Society as an aid to the education of the young engineers who constituted the bulk of its members, he touched upon the connexion subsisting between *civil* and *mechanical* engineering, and then summarised the qualifications required by the followers of these two main branches of the profession of engineering, adding what may be called a *précis* of some of the chief practical points arising in professional practice. While the two branches of the profession were to some extent divergent from each other, yet he was convinced that it was next to impossible to be a sound and successful civil engineer without a considerable acquaintance with the work of the mechanical branch of the profession. It might be, and was, argued by some that it was always possible to separate the work of the two branches, leaving the purely mechanical engineer to work out the practical details of construction after the broad outlines had been arranged, it being, it was urged, too much to expect one man to possess an intimate acquaintance with many and varied details. While that was true to a limited extent, it was none the less true that an engineer could more correctly design large works if, at the same time, he knew how the details of construction should be carried out. In these days of large public works and special appliances, it was not sufficient for an engineer to be able to design correctly the various parts of a structure; he should be capable, if called upon, of designing special plant for special requirements, in order to secure economy of construction. This might seem to be more directly the business of the contractor, but many works were constructed without the intervention of a contractor, and in such cases the engineer was responsible, not only for the design, but for the construction of the work; and even where a contractor was employed, the same knowledge was required from the engineer, because an acquaintance with the best means and appliances for construction under special circumstances might so modify the details of design as to cheapen a structure without impairing its efficacy. As an example of this, Mr. Hill cited the case of the Dublin river wall, where huge blocks of concrete, weighing each nearly 400 tons, had to be lifted, transported, and deposited in place; and much ingenuity was displayed by Mr. Bindon Stoney, the engineer, in designing the monster machinery for that work. A barge was employed carrying floating shears with an overhanging jib capable of suspending a large block over the end of the barge, and in that position transporting it to the required position in the work. Manifestly this system could only be employed in smooth water. A similar problem had presented itself in the works at Jersey, but under different conditions. There the blocks were from 70 tons to 100 tons in weight, and had to be deposited in the open sea. There, as at Dublin, a barge was employed, but instead of the overhanging shears,—which with a small wave movement would cause a great oscillation of the suspended block of concrete or stone,—the block was suspended underneath the barge from a strong framing on deck, and manipulated by a powerful winch arrangement. On the blocks so deposited at Jersey a superstructure of concrete blocks, each weighing 12 tons, was raised, the blocks being set in place by a specially-designed overhanging travelling-crane, called a "Hercules," having a traverse of over 50 ft. At a work now being carried out

* See vol. xxxv. (1877), p. 727.

in South Africa a similar machine was employed, with somewhat less overhang, but capable of dealing with blocks of 25 tons each, and also capable of being used for depositing from a box large bags of concrete to form the substructure to receive the blocks. In Ceylon, in connexion with other large works of the kind, a similar machine was being used for depositing blocks of between 30 tons and 40 tons weight. These machines had all been designed by Sir John Coode to suit the special requirements of each place, and they were all so contrived that the blocks could be brought from the block-yard and then picked up by the machine and set in the work, the machine moving forward as the work proceeded, thus obviating the necessity for temporary staging, which was not only a very expensive item in first cost, but was always liable to damage during stormy weather, whereas the machine could be run back to a place of shelter. Similar machines had been designed by Mr. Parkes for his works at Kurrachee and Madras, to deal with blocks of 27 tons weight. There was no doubt that in the future, where works of magnitude had to be constructed, special appliances would come in for much attention. As an evidence of this it was only necessary to mention that the estimated cost of plant in connexion with the harbour works at Batavia was 83,000*l.*, while within the last six years more than 85,000*l.* had been expended on plant at the Antwerp harbour works. With regard to mechanical engineers, Mr. Hill, in concluding his paper, insisted that they should be trained in engineers' workshops.

On the motion of Mr. A. T. Walmisley, seconded by Mr. R. Harkness Twigg, the thanks of the meeting were given to Mr. Ellis Hill for his address, of which the foregoing is but an abstract.

FROM ABROAD.

THOSE, and they are many, who fear the danger of a multitude of counsellors in questions relating to the fine arts, will have reason to be somewhat astonished at the extended and complete nature of the council which the French Government has called together to assist the Secretary of State for the Fine Arts in his arduous duties. A reconstitution of this council has recently been officially announced. Its composition offers some features of interest apart from the fact that we meet with most of the names familiar to us in the artistic world of Paris. Were it only to show the practical importance attached by our neighbours to the consideration of the numerous art questions that present themselves, and the desire of the Government to meet every contingency, an enumeration of the officials who form this council is of instructive value. Presided over naturally by the Minister of Fine Arts, are nominated members "by right," the Prefect of the Seine, the secretary of the Academy of Fine Arts, the Administrator of the National Museums, the Director of the "Bâtiments civils," the Inspector-General of Drawing, the Director of the National School of the Fine Arts, the Director of the Conservatoire of Music, the Vice-president of the Commission of Historic Monuments, the Director of the School of Decorative Art, the Curator of the Museum of the Luxembourg, the Commissary-General of the Fine Art Exhibition.* The council thus far constituted, a further addition is made by the annual election of twelve artists, members of the French Institute, who take the place of our own Academicians, and what may be termed "outsiders"; six painters, two sculptors, two architects, an engraver, a musician, a member of the French Academy, a member of the Academy of Inscriptions, two member of the Superior Council of Public Instruction, two senators, two deputies, a councillor of State, a member of the directing body of the Sèvres manufactory, as also of the Gobelins tapestry works, two representants of the arts applied to industry, an inspector of fine arts, and six persons distinguished for their literary acquaintance with art. The council thus constituted is to meet every three months, but it can at all times be convoked by the Minister of Fine Arts. Subcommittees will be formed for the preparation of special reports. The subjects for consideration of the council are numerous, the annual exhibitions, the various competitions, the national manufactures, the archæological or artistic missions to foreign countries, and a number of other questions relating to art, the Minister of Fine Arts will submit to the attention of the council. Thus formed, the council for this year gathers together a characteristic choice of names, many, if not most, familiar to the public. Among the painters, Henri Lehmann, Cabanel, Gerôme, Bonnat, Breton; sculptors, Barrias and Chapu; Bœswillwald, Inspector-General of the Historic Monuments, and an eminent architect, together with M. Garnier; Flameng the engraver; M. Renan, of the French Academy; M. Perrot, the archæologist; M. Galland, of the École des Beaux-Arts; M. H. Bouilhet, of the Union Centrale, a manufacturer who worthily represents the application of the arts to industry. Among the art critics, MM. Alexandre Dumas, Edmond About, Charles Clement of the *Débats*, Eugene Véron, director of the journal *L'Art*, and Charles Blanc. This assemblage of names, including so generously the most widely-differing opinions in a council intended to watch the artistic interests of the country, is characteristic of the method in which our neighbours treat the consideration of the fine arts in their bearing on the community. Mr. Mundella was right, the other day, in expressing his belief that without the efforts for the encouragement of art made of late years our trade would have suffered by millions.

That importance which is attached in all thinking minds in England to the proper education of the workmen, the manufacturers, the employers of labour in future, is no less felt abroad. Only a few days since M. Jules Simon, in reading before the Academy of Inscriptions and Belles Lettres a portion of his collection of Reports on the Exhibition of 1878, successfully showed how completely we may attribute the advance of industry in the present day to the progress made in science and intelligence, the work of our superior schools; to their still greater development he looks for the future of industry. "Let us give professional schools," the eminent statesman and Academician said, in concluding his address; "let us give professional schools to our miners, our blacksmiths, our decorators, to our weavers, our watchmakers, to our carvers, our cabinet-makers, to our cultivators. But let us remember to make of them men, because it is with men that workmen are made manufacturers and *savants*; primary and secondary schools to make men, schools of apprentices to make workmen, schools of application to make engineers and chemists, superior schools to make *savants* and professors. Let us make a crusade for education and science. In the situation in which the course of events has placed us, it is no longer possible to be ignorant,—to stop. We must advance, or fall."

The interesting Château de Blois, it may not be uninteresting to many to learn, is at present undergoing important repairs, in accordance with the determination of the Historic Monuments Commission. The works consist in the restoration of the roof and the upper portions of the château built in the time of Francis I., in which the chimney-stacks and the skylights are in a far from proper condition, although they by no means belong to the original building.

From Amiens we learn that at the cathedral have been terminated the series of casts which are to form part of the Museum of Comparative Sculpture to be installed at the Palace of the Trocadéro in conformance with the proposal of the late Viollet-le-Duc, as was announced in these columns at the time of the eminent architect's death. Successful casts have been taken of a number of the characteristic figures, the "Vierge Dorée" and two apostles from the great portal, that of St. Sauveur, with its pedestal and the various ornaments which form the general surrounding decorations; in the interior, a cast from the figure of the bronze tomb of Erarde de Foulloy and of Godefroid d'Eu. It is to be hoped that our Government may obtain duplicates of these delicate works. Is it not time, when we consider what is being done abroad, for our Government to bethink itself of again taking up a proposal which has been more than once put forward, the establishment of a special museum of casts?

The three so far promised exhibitions of next year are each, from all accounts, in admirable train. From the *Frankfort Gazette* we learn that owing to the activity displayed by the committee of the exhibition of "Patents and Trade Marks," which was announced in these pages, the number of exhibitors has already reached 1,200, while the site of the exhibition has had to be enlarged from 8,000 to 14,000 square yards. We may look forward, therefore, to an interesting show.

The Paris Exhibition of Electricity is also now completely decided on, and a recent official announcement states that the bureau of the exhibition and the commission of the International Congress of Electricians are now installed at the Palais de l'Industrie in the Champs Elysées, where all information can be obtained. The arrangements of the exhibition were definitely agreed upon only a few days since. The exhibition opens on the 1st of August next, to close on the 15th of November. Foreign exhibitors will be represented by a special commissioner for each nation; by a wise arrangement the exhibitors will not be called upon to pay for the space they occupy. The principal classes to be represented are telegraphy, telephony, the production and distribution of light, light-houses and signals, electric motors applied to industry, wires and cables, galvano-plastic, and the various applications of electricity to the fine arts. A lithographic collection and an historical museum will complete the show. It has wisely been determined to distribute among the workshops a large number of free tickets.

As for the Milan Exhibition, the Milan papers duly record the progress being made. The Italian Government has recently determined that an important feature of the show is to consist of an industrial museum formed of a complete collection of specimens, each to be price-marked, of all Italian manufactures or products which are capable of being made staples of an export trade. Should this collection be really completed we may look for some curious and interesting results.

The mention of Milan may, perhaps, be considered sufficient excuse for the introduction here of a charming artistic anecdote related of Garibaldi by a correspondent of one of the French papers during the recent visit of the popular Italian hero to Milan. Among the numerous persons presented to him, Garibaldi received the representant of one of the Paris illustrated papers. "Be welcome, dear sir," said the old soldier to the artist, "you are one of my friends; for I am like the children,—I like picture-books, and I love those who make them."

THE FOG QUESTION.

IN the paper read at the Society of Arts the other evening, Dr. Alfred Carpenter, after demonstrating the nature of the black fogs of modern times, proceeded thus:—It is much easier to point to a nuisance than to get it removed; I always object to criticism, unless it shows a better way of doing things. I object to overthrow an institution without being provided with something better to put into its place, even if that institution is a nuisance. The overthrow of the domain of fuel-smoke might be purchased too dearly. There is something so endearing and so national about our domestic hearth, so captivating about the ability to poke a fire, that I should never expect to remove these comforts from our midst; neither is entire removal necessary. The ability to poke a fire is the one thing which preserves many a mind from downright insanity, and to take away the power would consign many an unstable mind to a madhouse. The thing is not to be done, therefore, without due consideration. Thousands of fires, nay tens of thousands, would not produce a London fog, spread about, as they might be, over the 300 square miles which constitute the metropolitan district. A few such fires would do harm, and if such fires, being a luxury, were made to assist in performing a duty towards those who could not afford the luxury, good might come out of evil; though I would not support the notion that it is right to do evil that good may come. The question is, How are smoking chimneys to be got rid of? It is a process which the Society of Arts, with all its array of powerful names, will not be able to effect. An appeal must be made to the Legislature upon the point, and I suggest that the Society be foremost in making that appeal. Let us ask them to pass such laws as will help forward the object which we have in view, for public opinion, public spirit, and philanthropy will not alone be able to effect it. I believe that a short Act would be sufficient. That if local authorities had the power to levy a tax upon every fireplace so constructed as not to consume its own smoke, the smoke nuisance would then disappear in a very few years. They should have the power to use the proceeds of

* By a decree, published only within the last few days, the professor of Archæology of the Ecole des Beaux Arts is added to the Council.

that tax in the purchase of the gas and water-works of the district, and so enable local authorities to provide the capital necessary for the purchase of these works without having to add materially to the local rate. Gas, like water, has become a necessary of life; no large town can carry on its work in the world without gas. It is false political economy for dividends from gas and water to be paid out of the life-blood of the country. Its property should provide the capital for the purchase of such works. That capital should be sunk at once, and the consumers of both gas and water should only be called upon to pay the cost price of the product, with such other charges as might be sufficient for the maintenance of the works in an efficient state, and when extensions are required, the property requiring the extension should pay the cost.

The practical experience of large consumers tells us that gas even now can be produced in the neighbourhood of London at 1s. 6d. per 1,000 cubic feet if the charges on capital account are kept out of the balance-sheet, and they publish the fact in their own accounts. I take it, therefore, that 2s. per 1,000 would cover the expense of production, distribution, and maintenance; and if gas was supplied at that price in London, it would soon find favour as a cooking and warming agent, and would greatly assist to extinguish the smoke-fogs (provided means were taken at the same time to put an efficient law in force against some of the most notorious of the company offenders). There are, probably, 4,000,000 fire-places in the metropolitan district; an average tax of 20s. upon each of these, payable after two years' notice, would cause the removal of three-fourths of them, and the remaining million would provide a fund which would, for a time, go some way towards paying off principal and interest upon the purchase of the London companies' claims in their works. If three-fourths of the fires were deprived of their smoke, the atmosphere of London would be deprived of much of its noisomeness. This might be still further diminished by rendering it incumbent upon those who continued to have open fire-places to burn only that coal which had been partially deprived of its smoke-producing qualities.* Indeed, the sale of any other coal to private consumers might fairly be prohibited, and a considerable increase might be made in the coal dues upon that part of the coal which continued to be distributed within the metropolitan district when that coal was intended for consumption in open grates. These charges would, in a few years, remove nineteen-twentieths of the noxious matter which is now discharged into the atmosphere of the metropolitan district. It is probable that the production of a fog is something like the production of a frost. The temperature must fall below 32° before a frost begins at all. If the temperature is high, the reduction for a degree or two is of no consequence. It is only when near to the freezing-point that it becomes important as regards the production of ice. So it is also probable that, to produce fog, there must be a concurrent smoke from a certain number of chimneys within a given area, and if that number is not reached, there will be no fog, even when meteorological conditions are such as may favour its production.

My proposition will be met by innumerable objections; all great social changes are so met. It is only by answering those objections, or showing them to be unsound, that real progress will be made. First, then, as to gas fires, which I suggest as alternatives for open fireplaces. I am told that they are injurious to health, that they are comfortless, that they make the air of the room so dry, that they smell offensively, and that the heavy gases which are formed at the base of the fireplace will find their way into the room. These are fair arguments against bad workmanship, but are not sound as against gas fires. I have had a gas fire for some years in my consulting-rooms and library, and no one, at first sight, can know it from an ordinary coal fire. It never smells, and warms a large room thoroughly; there is no dust, and no work for the housemaid to do, and no destruction of books and papers from dirt. But I must not poke it, and I must not burn rubbish upon it. These are, next to its cost, its only disavantages. A gas fire cannot dry the air of a room to a greater degree than any other fire. If a smell comes from it, the fault is in the work or the stove construction, and would happen at the same place with any other material. If I had gas in all my rooms, I could do with one servant less in my household. Chimney-sweeps, who are now necessary adjuncts to every house, would find their occupation gone, and the mischief which soot and dust produces in every house would not arise. This would effect an enormous saving in our domestic outlay, and our domestic works of art would last much longer than they do under our present *régime*. Common grates need not be removed, gas fires can be fitted to any ordinary grates, and the only expense need be the cost of laying on the gas. I shall be told that it will be quite impossible for the poor to do this. It is not a thing which the poor should be called upon to do. The tax upon open fireplaces should fall upon the landlord, and in the case of weekly tenements, the landlord should collect the charge for gas when he collects his rent. If the rent is not paid, he should have the remedy in his own hands, by at once cutting off the gas supply. I am so satisfied of the power of our stove manufacturers to meet this point, by constructing stoves which should give a maximum amount of heat with a minimum amount of gas consumed, that I should hail the change as one giving an immense boon to our labouring population, by providing them with warmth without waste, and taking from them that tremendous source of dirt which smoke produces among them, and which manifests itself upon the faces and clothes of the children of our poor population. The pocket saving would not be the least part of the work, for no one can watch the waste which the poor man has to suffer in his efforts to make a little fire to burn up, without feeling that the change would be very much to his interests. Whilst, as far as the gas rental is concerned, the poor should be called upon to pay the average weekly cost in advance, just as they now have to pay for the coal before it is consumed. There would be no injustice or hardship in this, provided the law gave them a right to a drawback upon that which they did not consume. The enormous advantage of a gas fire in a sick room has only to be felt to be at once appreciated. There is no waking up the patient by having to poke the fire and put on coals; there is no sudden discovery that the fire has gone out whilst the wearied nurse has slept, at the moment, perhaps, when it was very important that the air of the room should not get chilled. Indeed, the advantages of being able perfectly to regulate the heat of the room in such cases is immense. Those who do not like a gas fire need not be obliged to have one; they may find a much cheaper substitute in the beautiful slow-combustion stoves which are now very generally manufactured. I would especially refer to those of Mr. Doulton, at the Lambeth Potteries, and which are formed of fire-clay; I prefer these to those made of iron. The fire-clay radiates heat much better, without depriving the air of its health-giving qualities. No one can have compared the heat given out by a common fireplace, having a fire-brick back, with one with only an iron plate, without at once giving the palm to the fire-clay material. These stoves provide that nine-tenths of the heat produced by the fuel consumed shall be utilised in the apartment, and not sent up the chimney, as is now done from ordinary fires. These stoves are a great advance upon the ordinary iron stoves. The air is not altered in its character by coming into contact with hot metal. The stove is not a nuisance in its appearance, but may be made an imperishable work of art, which will bear ill-treatment, and only want washing when dirty, instead of paint or blacklead, which, when used, smells most abominably all over the house. I think it very important that the use of fire-clay should supersede that of iron. Coal, as now burned, is burned to waste; in all other fireplaces, and in great numbers of ordinary stoves, the heat generated is dissipated in the air above our houses. There was a scare some time ago regarding the exhaustion of our coal-fields. The bare possibility of such a thing should lead the Legislature earnestly to consider the fact that not more than one-sixth of the coal now consumed is usefully employed, and its waste might very fairly be prevented.

There is also another question which this change would solve, and which would be of immense advantage to the local authorities of the metropolis. Tens of thousands of loads of ashes which now block the dustbins, and are such an incubus to the vestries, would then have no comparative existence. The organic matter which the vestries would have to collect and to dispose of could be easily dealt with by fire. There would be other changes besides a purer air; it would give relief to the traffic of our streets by taking out of them the long array of coal-wagons and dust-carts which now delay other and more important traffic; and the vestries would find a solution to a question which at this moment is exercising their ingenuity to a very serious extent, without their being able to find a solution for their difficulty. Then look at the architectural advantage in an æsthetical point of view. Imagine London without those productions called smoke-preventers, and those hideous chimney-stacks which spoil all proportion. Think of the incubus which would be removed from the architect's mind when he felt satisfied that the chimney-doctor would not be required for the purpose of spoiling the appearance of his edifice. . . . . I am in doubt as to the best mode of proceeding; but this meeting will, I feel sure, endorse Mr. Micawber's opinion that "something must be done," without following that gentleman's example, but will advise that action be taken of a determined character. I would propose that the Home Secretary be approached, and that he be urged to procure the appointment of a Royal Commission to inquire into the whole subject. I have put before you my own views under three heads. They are:—

1. The causes of the intensity of town fogs. I refer these to fuel smoke, which I contend to be an unnecessary adjunct to fire. That the method now used for warming our houses and cooking our food is wasteful in the extreme, and five-sixths at least of the developed heat is lost, and much of the fuel passes away unconsumed.

2. The means which should be adopted to prevent these causes continuing in operation. These means should be the production of gas at a cheap rate, so that it might be used for cooking, and in many cases for heating purposes also. In reference to this point, I would observe that the use of gas for lighting purposes will pass away; it would be to the interest of the companies that heating power should be developed in the gas manufactured rather than lighting, and that it would be promoting the object we have in view if the sale of coal was prohibited in the metropolitan district, unless it had been previously deprived of its smoke-producing quality. That a tax upon fireplaces not so constructed as to consume their own smoke would effect this object, which might also be assisted by a heavier tax upon the untreated coal when sold for public consumption in the metropolis. That the proceeds of these taxes should be used by the local authority in extinguishing the present commercial companies who manufacture gas and distribute water. That the use of closed stoves should be encouraged as much as possible.

3. That the steps which should be taken to promote these objects would be best met with by urging upon the Government the propriety of appointing a Royal Commission to inquire into the whole subject, and who should formulate the grounds upon which legislation should be established, and prepare the way for the introduction of a Bill into Parliament for the purpose.

* This proposal, for which the *Builder* is responsible, appears to be steadily gaining ground.

The Leicestershire Architectural and Archæological Society. — At a meeting of this Society, on the 29th of November, the Rev. W. Dimock Fletcher, B.A., read a paper on "The ancient Brasses in Loughborough Church." In introducing his subject, he observed that an account of all the monumental brasses remaining in the county of Leicester at the present time would be very interesting. He thought it would be found that many of those mentioned by Nichols were now missing, whilst perhaps in a few cases some not noticed by him had been brought to light. When Loughborough Church was restored, some fifteen years ago, the few remaining brasses were fixed to the south wall of the tower. They are as follow:—1. The fragment of an inscription to Robert Fry, rector of Loughborough, and deputy-keeper of the King's privy seal, 1435. This brass was formerly on the south side of the chancel. 2. A brass to Giles Jordan, and Margaret, his wife, 1455,—not 1415, as stated by Burton and Nichols. 3. An inscription, in two lines, to Thos. Marchall, 1480. 4. The matrix alone of a brass which formerly lay near the entrance to the chancel, to Robert Lemington, merchant of the staple, and his wife, 1512.

HIGHBURY BARN ESTATE, ISLINGTON.

THE Highbury Barn, almost the last of the places of popular resort in London, is doomed. It consisted of a large pleasure-garden, containing about five acres of ground, in which were situated various buildings and arbours.

The peculiarities of the site have made it difficult to deal with, and more than once the Metropolitan Board have rejected plans indicating what seemed the only solution of the problem. In shape the ground may be likened to a rather fat bottle, surrounded by other properties, of which the neck is considerably the highest point, and the difficulty has been to empty it and to provide the "two entrances at least" required by the bye-laws of the Metropolitan Board. The estate has been repeatedly taken for building, and each time has been given up in consequence of the difficulties of outlet and drainage. These difficulties have at last been overcome by Mr. Frederick Snelling, for whom the estate is now being laid out by Mr. Charles J. Bentley, surveyor, of Wandsworth, and the sanction of the Vestry and the Metropolitan Board has been obtained both for the roads and sewers. By the purchase of No. 48, Highbury-grove, which adjoins the property on the south side, a second outlet has been obtained.

It is proposed to erect nearly 100 nine-roomed houses, to be fitted with baths and all modern conveniences.

LUDLOW WATER SUPPLY.

THESE works, which were commenced about twelve months ago, were formally opened last week. A jet from the hydrants at Castle-square, and another at the Bull Ring, went over the tops of the houses. The supply comes partly from the Coppice Spring on the Whitcliffe, but the principal source is a spring rising in the large meadow above Burway House. This spring rises about 1 ft. above the summer level of the river, and is brought in a 9 in. cast-iron syphon, having a dip below the summer level of the river of 4 ft. 9 in. It is then carried in 9 in. earthenware pipes for a distance of 1,578 yards by gravitation, the fall being 1 in 740. From the well in which these pipes terminate a 6 in. cast-iron suction 1,300 yards long, fall 1 in 974, is laid to the pumps. These pumps, two in number, resemble the pumps of a horizontal engine, but the motive power, which is water acting on a turbine-wheel, costs nothing for coals and very little for attention, except at the fall of the leaf. The Sanitary Authority having been advised to adopt a turbine as motive power, they obtained from Messrs. Stothert & Pitt, of Bath, plans and estimate of the Fourneyron wheel, with Mr. Cutler's improvements, as applied by them at the Taunton Sewage Works, the Windsor Waterworks, and elsewhere. Some leading members of the committee, including the Mayor and ex-Mayor, accompanied by Mr. Curley and Mr. Clarke, paid a visit to Windsor to inspect the working of the very large turbines and powerful pumps in use there for supplying Eton, Windsor Town, and the Castle, and finding there was no reservoir, and that the supply direct from the turbines had been constant day and night,—floods or no floods,—for several years, they were satisfied. As, however, the Act requires competitive tenders to be obtained, an advertisement produced other designs and prices from every maker in England, and even from Ireland. None of these appearing to be so advantageous either in design or price as the original offer, it was accepted. The turbine is of the class known as the "horizontal outward flow," invented by the celebrated engineer, Fourneyron, and manufactured, with important improvements, by Messrs. Stothert & Pitt, of Bath. It consists of a horizontal water-wheel of 6 ft. 6 in. diameter with curved buckets or channels 9 in. high, revolving round a fixed chamber of smaller diameter, having corresponding water-channels, but curved in the opposite direction. The pumps, two in number, are double-acting horizontal, brass-lined, 5¼-in. bore, fitted with Holman's patent buffer-valves. The stroke may be either 10-in., 14-in., or 18-in. at pleasure, the variation being effected by the ingenious and novel contrivance of revolving the crank-plate excentrically to the main shaft. From the pumps of this turbine a 6-in. rising main is laid to a covered reservoir on Whitecliffe. From this reservoir a 6-in. main is laid along the highest part of the borough, and from this main 3-in. service pipes are laid in the streets running north and south. There are 2,184 yards of 6-in., 2,058 yards of 4-in., and 5,530 yards of 3-in. pipe laid. There are twenty-nine sluice-valves or stop-cocks, and fifty-seven hydrants or fire-plugs. The reservoir is 170 ft. above the level of the river at the turbine, and its capacity about 240,000 gallons.

Mr. Davis, of Ludlow, was the contractor for the general works, which amount to 3,925*l.* 15*s.* 9*d.* on the final measurement at the winding up. Mr. Curley, of Hereford, was the engineer, and Mr. Clarke, of Ludlow, was the clerk of the works. Messrs. Guest & Chrimes supplied the hydrants and sluice valves; and Mr. Jordan, of Newport, the pipes.

ELECTION OF TWO DISTRICT SURVEYORS.

AT the meeting of the Metropolitan Board of Works, on Friday, the 17th instant, the first business on the agenda was to receive applications from candidates for the appointments of district surveyors for the districts of East Streatham and Brixton (part of Lambeth), and West Streatham, into which the district assigned to the late Mr. Mullins has been (as we stated last week) divided. For the two appointments there were thirty candidates, whose names, together with the votes received by them in the first voting for each appointment, are as follow:—

	East Streatham.	West Streatham.
Ashbridge, A.	19*	13
Bridgman, H. H.	15	14
Brooks, C. W.	12	15
Buxton, W. J.	1	0
Carritt, E.	22	24
Conder, A.	19*	15
Dale, D. R.	23	25
Edmeston, J. S.	7	5
Elkington, G., jun.	17	14
Ferguson, J. M.	4	6
Grellier, W.	7	7
Hewitt, E. R.	14	20
Hunter, P.	12	13
James, J. W.	12	8
Karslake, L.	10	6
Large, W. A.	17	21
Lees, W. H.	12	9
McLachlan, H.	9	6
Mundy, T. E.	9	9
Notley, F. C.	18	16
Pownall, R. E.	10	10
Quilter, J. S.	32	0†
Scrymgour, W. H.	11	13
Smallpeice, W.	13	14
Stenning, A. R.	21	15
Stone, F.	5	5
Stone, T.	3	2
Street, E.	17	15
Taylor, A. T.	5	6
Todd, F.	19*	26

The subsequent voting was as follows:—

East Streatham.

	Second Vote.	Third Vote.	Fourth Vote.	Fifth Vote.	Sixth Vote.
Carritt	18	20	15	15	—
Conder	11‡	8	—	—	—
Dale	20	21	21	20	13
Quilter	30	22	25	26	25
Stenning	11‡	—	—	—	—
Todd	19	15	13	—	—

Mr. Quilter was therefore declared to be the successful candidate for this appointment.

West Streatham.

	Second Vote.	Third Vote.	Fourth Vote.	Fifth Vote.	Sixth Vote.
Carritt	15	15	14	—	—
Dale	23	23	25	26	26
Hewitt	7	—	—	—	—
Large	20	17	18	14	—
Notley	10	7	—	—	—
Todd	18	19	17	18	10

Mr. Dale was therefore declared to be elected for this district.

Messrs. Quilter and Dale, in answer to the chairman of the Board, Sir James M'Garel Hogg, undertook to perform the duties of the offices to which they were elected in accordance with the usual conditions imposed by the Board, and returned thanks for their election.

Mr. Richard Redgrave, R.A.—Mr. Redgrave has received a C.B.-ship in acknowledgment of his services to the Science and Art Department, South Kensington.

* In accordance with the usual practice, the number of candidates was reduced to six. The four highest on the list in this voting were, as will be seen, Messrs. Carritt, Dale, Quilter, and Stenning, but next in order came the three candidates thus marked, between whom there were ties. On the voting as to which of the three should be excluded from the six from whom the final selection should be made, the numbers recorded were:—Ashbridge, 12; Conder, 21; Todd, 20. Mr. Ashbridge was therefore out of this contest.

† Elected for East Streatham.

‡ In a subsequent voting as to which of these names should be retained for further voting, the result was,—Conder, 18; Stenning, 12.

NEW BUILDINGS IN THE HAYMARKET.

THE architectural appearance of the Haymarket is at present undergoing a considerable improvement by the erection of new buildings in that lively thoroughfare. For some time past a lofty and handsome new frontage has been in progress at the premises of the Civil Service Co-operative Stores, and it has just been completed. The Haymarket elevation, which is carried up to a height of between 70 ft. and 80 ft., is in Dumfries stone and red and grey polished granite, the ground-floor portion being entirely in the last-named materials. The entrance to the stores is upwards of 10 ft. in width, having grey jambs and head. The main face of the upper portions of the elevation is in Dumfries stone. The windows of the several floors are deeply recessed, and ornamented with red granite shafts, the second floor containing a range of arched windows. The building has a high-pitched roof, containing circular dormer windows, and finally surmounted by a cresting in zinc, the roof being covered in with the same material. The entrance to the building leads into a spacious decorated vestibule, the floor of which is laid with mosaics, in varied patterns and colours. The walls and ceiling of the vestibule are divided into panels, and faced with hand-painted tiles. From the ground-floor of the interior the upper parts of the building are reached by two staircases, 8 ft. in width, faced with enamelled tiles in varied colours, and laid with Hawksley's patent treads. Mr. Verity is the architect of the building, and Messrs. Kirk & Randall were the contractors.

On the opposite or west side of the thoroughfare a prominent block of new buildings is in course of erection for Messrs. Adams & Sons, ironmongers and electric bell manufacturers. These will have a frontage to the Haymarket of about 55 ft., 80 ft. in height, and will contain three floors and attics, with dormers, above a lofty ground-floor, and *mezzanine* floor as a spacious show-room. The building is entirely in Portland stone, the first-floor windows, as well as the dormers, having pediments. In addition to the Haymarket elevation there will also be a uniform return frontage in Norris-street. The building is being erected in two sections, and the first portion is now completed. Messrs. Giles & Gough are the architects, and Mr. W. Brass, of Old-street, is the contractor.

NEW BUILDINGS IN SUNDERLAND.

OCCASION has already presented itself to indicate generally in the columns of the *Builder* various important street improvements in the immediate vicinity of the New Central Railway Station in High-street West, Sunderland. We have now to note the completion of Messrs. Blackett & Son's (drapers) handsome new premises, and also that of the new Butcher, Fruit, and Dairy Produce Market, erected by private enterprise. Messrs. Blackett's new warehouses, of three stories, occupy a space of 104 ft. in new Union-street, and a frontage of 48 ft. to High-street West.

Passing the Phœnix buildings lately erected in Union-street by Messrs. Pearman & Corder (already described in our columns), one reaches the new butcher-meat and dairy-produce market, which has been erected to meet the requirements not only of the inhabitants of the west end of the town, but of the numerous visitors to Sunderland by rail from the outlying colliery districts. The building, which was commenced in May last, and has just been opened to the public, stands immediately on the west side of the Central Station, and has a frontage to New Union-street, with an entrance also from South-street. It is of red brick, all the cornices and other mouldings being run with cement. The front is divided into nine bays by pilasters with moulded caps, and in each bay is fixed a large window. The length of the edifice is 97 ft., and its breadth 66 ft., the height being to the top of the walls 16 ft., and to apex 31 ft. The entrances are closed in by revolving shutters. The iron roof is covered with boarding and slating, on each side of which have been fixed roof-lights, while running the whole length of the roof is a louvre ventilator. In the interior, accommodation has been provided for nineteen shops. The flooring has been laid with concrete, with the necessary falls for carrying off refuse. The general lighting is effected by six ornamental gaseliers suspended from the

roof, in addition to which each shop has its own independent lights. The necessary sanitary accommodation is provided at the south-west corner.

The architects of the new building are Messrs. J. & T. Tillman, and the contractor for the mason's work is Mr. Mark Howarth, and for the joiner's work, Mr. Davidson Taylor, all of Sunderland.

THE CITY CLUB, LUDGATE CIRCUS.

"Cook's Tourists" have been and still are sneered at occasionally by writers and talkers who forget that travel does a great deal to broaden people's views of men and things, and who fail to recognise that the man who makes travelling easy and cheap is a real benefactor to his race. The firm of Thomas Cook & Sons led the way in providing well-organised facilities of travel, and still maintain the lead; and it is to the managing partner of the firm, Mr. John M. Cook, that credit must be given for having met, with characteristic enterprise and foresight, a want that has long been felt in the City, particularly in that part of it where journalists of all grades most abound, viz., Fleet-street and its vicinity. That want is supplied in the establishment of the City Club, which is located in the four upper floors of the handsome and extensive stone building which was erected some five or six years ago at a cost of some 60,000*l.*, for Messrs. Cook, at the corner of Fleet-street and Ludgate Circus, and which has return frontages to Farringdon-street and St. Bride-street. The position is excellent. Messrs. Cook's tourist offices and the Ludgate Circus Branch Post Office occupy the ground floor, the proprietors also retaining the *mezzanine* for their own use. The upper floors have until lately been sub-divided and let out as numerous offices, mostly those of press agencies and provincial journals which need (and all daily provincial journals do need) offices in London. Recently, representations were made to Mr. Cook that he would be well supported if he were to devote the four upper floors of the building to the purposes of a club for clerks and others engaged in the City in mercantile or other pursuits, with special provision for the accommodation of members of the Press. Mr. Cook happily seized the idea, and has put it into execution in a manner that has elicited the warmest encomiums from all who have seen the premises. Mr. Horace Gundry, the architect from whose designs the building was erected, has (as we stated a few weeks ago*) been employed to superintend what slight structural alterations were needed, which have consisted for the most part in here and there removing partition-walls so as to make two or three rooms into one, and in making doors of communication in the partition-walls that remain, so as to throw all the rooms on a floor into direct communication with each other, besides having separate means of access from the staircase landings. The rooms are tastefully decorated and furnished. The decorative work has been done by Mr. Laing, of Duke-street, Adelphi, and the furniture, which is good throughout, has been supplied by Messrs. Maple & Co., of Tottenham Court-road. The entrance to the club is in Fleet-street by a lobby, from which stairs run up above the *mezzanine* to the spacious entrance-hall, where members can leave their hats, coats, umbrellas, &c., in the care of the hall-porter. On the left of the hall is the "Press Writing Room," a handsome apartment, provided on either side with a row of specially-designed desks, partitioned off into spacious compartments, and provided with seats. These desks have good window-light by day, and are provided with Sugg's London argand burners with opal glass reflectors for use by night. In the centre of the room is a large writing-table for those who do not seek the privacy of the side desks. Altogether, comfortable accommodation is provided for twenty Press men to work at one time. This room is exclusively devoted to the use of members of the Press, and is open all night up to six o'clock in the morning, for the convenience of the reporters connected with the daily newspapers, although three o'clock a.m. would probably be late enough to keep it open. This feature of the club is much appreciated by Press men, who have already joined the club to the number of about 150, almost every one of whom is showing his appreciation of Mr. Cook's enterprise by bringing in new members. Well may they be grateful to Mr. Cook, for many of them (particularly reporters) are often compelled by the exigencies of their calling to write out matter for the Press under most disadvantageous conditions, cooped up in dirty corners of printing and publishing offices, in the midst of distracting noises, and not seldom in an atmosphere as warm at night, though very far from being as pure, as that of a Turkish bath. Again, reporters, attached as well as unattached to the staffs of the different journals, have frequently in one day to attend meetings held at intervals of several hours apart, and hitherto many of them have had no more improving waiting-place to resort to than the public-house. Here, again, the City Club meets a great want. On the right of the entrance-hall access is gained to the large reading-room, where no conversation is allowed, and opening out of this is a smaller, but still large, reading-room, in which conversation is permitted. These rooms are fully provided with all the London newspapers, periodicals, and magazines, and with a large and good representative collection of provincial, American, and colonial journals. Ingress or egress to or from all these three rooms is also obtainable by doors opening direct on to the landing of the capacious and well-lighted staircase, as is the case with the rooms above. On the floor next above the reading-rooms are the restaurant and dining-rooms, where members can dine or get a chop or steak and light refreshments as cheaply and as well served as at the more ambitious restaurants which have been established in London of late years. To some people one thing only will be lacking, and that is alcoholic beverages, for Mr. Cook is an earnest and consistent teetotaller, and has managed to exist for nearly half a century without using those beverages. He says boldly in his prospectus that "if the City Club cannot be conducted without the sale or use of intoxicating drinks on the premises, it will have to be given up." We imagine that few people to whom such a club is valuable will let their desire for a glass of beer prevent them from availing themselves of the other advantages which are offered to them by a public-spirited teetotaller. Mr. Cook, however, is no Puritan, for on the same floor as that containing the dining-rooms are two well-appointed billiard-rooms, while on the floor above are rooms appropriated to chess, draughts, cards, &c., besides smoking and conversation rooms. It is stated in the prospectus that many well-intentioned people had remonstrated with Mr. Cook as to the provision of opportunities for these games, but regarding such amusements as innocent and harmless in themselves, he expresses his firm determination to be watchful and to check and repress any abuses, should they arise,—and he is a man of his word. The fourth floor is devoted to the kitchen and service of the club. The whole of the club is open from ten in the morning until midnight, and on Sundays the reading-rooms, Press writing-room, and dining-rooms are open from two p.m. to ten p.m. Mr. Cook has spent more than 2,000*l.* in furniture and fittings, and states that his annual liability in respect of the establishment will be about 1,500*l.* On the present low basis of subscription (1*l.* per annum), to which the proprietor desires to adhere if possible, he will need about 1,500 members, and seeing that the club opened on the 13th inst. with 450, a number which has since increased to very nearly 600, there appears to be no reason to doubt that the venture will be a great success, and afford another illustration of the power of co-operation in such matters. The rich and titled classes of the community have long since availed themselves of this means, as the palatial buildings of Pall Mall testify; and Mr. Cook, in taking the initiative in the matter of providing somewhat humbler though still good club accommodation for business men and journalists, is making an important social experiment, in which he eminently deserves to succeed and to be imitated, even as he has been imitated in other matters.

* See p. 556, *ante*.

Smoke Prevention.—The Commissioners of 1851 having placed their testing-houses at South Kensington at the disposal of the Committee of the National Health and Kyrle Societies, it is proposed to hold an exhibition of smoke-consuming and preventing appliances, and to undertake the testing of various kinds of fuel.

PRIZES FOR ART WORKMANSHIP.

The Council of the Society of Arts have issued the following important notice:—

1. The Society's Medals in Gold, Silver, and Bronze, and Certificates of Merit, will be awarded for specimens of Fine Art applied to Industry, exhibited in 1881, by manufacturers, designers, art-workmen, or possessors of such works.

2. The works may consist of illustrations of any or all of the following processes, in combination or singly:—

1. Carving in marble, stone, or wood.
2. *Repoussé* work in any metal.
3. Hammered work in iron, brass, or copper.
4. Carving in ivory.
5. Chasing in bronze.
6. Etching and engraving on metal,—Niello work.
7. Enamel-painting on copper or gold.
8. Painting and modelling in pottery.
9. Decorative painting.
10. Inlays in wood (marquetry or buhl), ivory, or metal.
11. Cameo-cutting.
12. Engraving on glass.
13. Wall mosaics.
14. Gem-engraving.
15. Die-sinking.
16. Glass-blowing.
17. Bookbinding and leather work.
18. Embroidery.

3. To all works the name of the designer and art-workman must be affixed. Further detailed rules will be issued later.

4. It is arranged with the Council of the Royal Albert Hall that the place of exhibition for the above-mentioned works will be at the Royal Albert Hall. The time for sending in the works will be published hereafter.

5. The above regulations are issued subject to modification.

SALE OF CEMENT WORKS AT NORTHFLEET.

Extensive cement works at Northfleet, in Kent, which have for several years past been carried on by Messrs. Goreham & Son, were sold at the Auction Mart last week, by Messrs. Fuller, Horsey, & Co. The premises, which cover an area of about six acres, having a frontage to the river Thames of 350 ft. in length, were offered, with the whole of the buildings and the fixed plant and machinery on the ground. The property is held under lease for a term of sixty years from September, 1872, determinable by the lessees at six months' notice, in case of chalk not being supplied by the lessors according to the provisions of the lease, at a rent of 200*l.* per annum. The original lease contained a covenant under which the lessors bound themselves to supply the lessees with chalk at the rate of one shilling per loose cubic yard, until the 29th of September, 1894, the minimum quantity to be 20,000 cubic yards per year, but this contract has since been modified by waiving the stipulation as to quantity, and increasing the rate to 1s. 1d. per yard. There were several competitors for the property, which was sold for 3,850*l.*

Club House, Darwen.—The new Conservative Club at Darwen was opened on the 9th inst. by Colonel F. A. Stanley, M.P. The building is in the Gothic style, and has been erected from the designs of Mr. W. Perry, architect, Darwen. The principal façade in Church-street is faced with parpoints, which, together with the dressings and other stone work, have been obtained from local quarries. The elevation to Church Bank-street is built of brick, with stone heads and sills similar to those of the chief front. The building is oblong on plan. There are two main entrances in Church-street. To the right of the hall on entering is a private billiard-room (32 ft. by 24 ft. for two tables), with lavatory attached. From the hall access is also gained to the ordinary billiard-room (50 ft. by 24 ft. for three tables); and on the left to the reading, conversation, manager and secretary's, and committee rooms. A private staircase leads from the secretary's room to the lecture-hall and anterooms on the first floor. The public entrance to the lecture-hall is in Church-street. Another means of access to the ordinary billiard-room is afforded to the right of this entrance. The hall is 75 ft. long, 48 ft. 9 in. wide, 22 ft. from floor to ceiling, and 34 ft. from floor-line to top of ridge. A gallery is provided at the west end, having a storeroom and refreshment-bar underneath; the platform and anterooms are at the east end. The general contractor was Mr. J. Pilkington, Darwen.

DIGGINGS IN BŒOTIA.

DR. SCHLIEMANN and his wife have been staying for some time past in Bœotia, at the village of Skripa, near which they have been energetically pushing on excavations with a view to discover any remains of the pre-historical city of Orchomenos, the wealthy capital of the once famous kingdom of the Minyæ. Several shafts which Dr. Schliemann has sunk have afforded little result beyond a few relics of tombs, some vessels similar to those found in Mycenæ, and several inscriptions in the Æolic-Bœotian dialect. These Dr. Schliemann regards as of great value for Greek philologists.

While Dr. Schliemann has been comparatively unsuccessful in the excavations under his own special superintendence, his wife, who has been conducting researches in another portion of the ground, has been fortunate enough to find what are believed to be the remains of the "Treasury of Minyas." In a letter to the *Ephemeris*, dated November 23, Frau Schliemann says, "About noon to-day we came on a door and passage lying to the right of the Treasury. At the end of the passage was a second door, leading apparently to a tomb or chamber, and barred by a stone tablet covered with beautiful reliefs." The Government Commissioner who is attached to the excavating party, writing of Frau Schliemann's discovery, says "The door opens into a fine passage running in a northerly direction from the Treasury. At a distance of 3 mètres, however, lies a large stone which had fallen down from the roof and completely blocked up the passage. This stone is adorned with sculptured flowers, which may be taken as indicating that the decorated portion of the interior commenced here. The stone is rather more than 4 mètres in length, and 2 mètres in breadth. The height of the door is not yet known: it is 1·3 mètres in breadth." The remains of the Treasury of Minyas lie at the foot of Mount Acontion, on the north bank of the Cephissus. The real nature and purpose of the monument are not known. Frau Schliemann thinks that the door now discovered leads to a second chamber, which was not known to ancient excavators, and which, she thinks, may still contain treasures of very ancient date. The excavations which Dr. Schliemann and his wife are prosecuting with great eagerness will soon set this question at rest.

THE ORIGIN OF THE ARCHITECTURAL ASSOCIATION.

SIR,—It may possibly be a distinction without a difference, but I cannot see myself how Mr. Kerr, in speaking of the "Association of Architectural Draughtsmen," can say "*they joined us; we did not join them.*" If the object is simply the origin of the present Association, this would give any one reading it a wrong impression. The fact is that a certain number of young men, wishing to found an architectural society for their mutual instruction and improvement, finding the A.A.D., having very similar objects, already in existence, came to us in 1847, and we willingly at once amalgamated. We were a very limited number, it is true, but there was no question as to which body joined the other. We received them with open arms; they met for a time in our rooms; we at once altered such of our rules as they objected to, and we omitted the word "draughtsmen" from our title, which they did not like. But with these exceptions it has been one and the same Association from the beginning, and the honour of its formation is still due to James Wylson. I think I am not wrong in saying that this has always been the general feeling,—and the Architectural Association still put after their title, "Instituted A.D. 1842."

I do not for a moment wish to detract from the important part Mr. Kerr took in revivifying the body, but it is wrong to say that the A. A. D. was a mere "benefit club." We met week after week, although only a few of us, for our mutual instruction, and read papers on professional matters, and contributed drawings and sketches. These we discussed and criticised in a friendly spirit, and we instituted the very first of the Architectural Exhibitions, the permanent formation of which was for years afterwards an important object of the present Association. This original Exhibition was held at our rooms in Southampton-street, and was opened *free* to the public, and a very good show it was for so small a body. This, at least, shows that we were willing to benefit others besides ourselves. JAMES K. COLLING.

P.S.—I was not a "middle-aged married man" when the A. A. D. was formed. I was twenty-six, and most of the other members were younger. Not one of us could be called middle-aged, even in 1847.

WORKS BY THE BROTHERS ADAM.

SIR,—In reference to the notice which appeared in your last number of Mr. Batsford's valuable publication "The Architecture, Decoration, and Furniture of Robert and James Adam, Architects," it may be interesting to many of your readers to know that in the library of Sir John Soane's Museum are upwards of fifty folio volumes of original drawings made by the Brothers Adam.*

Many of these folios are filled with highly-finished designs for ceilings and wall decoration, drawn to a large scale and coloured with details given to a still larger scale. There are also some volumes of designs for chimney-pieces, mirrors and furniture, besides the more strictly architectural plans, elevations, and sections, etc.

Permit me to add that every facility is given at this Museum to students who may wish to refer to or copy from these works. CURATOR.

RADIATION AND CONDUCTION.

SIR,—I cannot understand the reason for the broad distinction which it is attempted to draw between radiated and conducted heat. A fire radiates heat into the room. The metal portions of a grate or close stove become heated by radiation and conduction, and they radiate that heat in the room, on the ceiling, floor, walls, furniture, and on our own bodies, and these in their turn radiate heat. The air is, undoubtedly, not heated immediately to a great extent by radiation, but that it is heated to some extent is proved by the fact that there is an ascending current of warm air in front of every fireplace. We shall never understand how air really becomes warm till we are conscious of the incessant motion which takes place in every apartment that is not almost hermetically sealed, and which causes that air to come into contact with the solid bodies that are really heated by radiation. We are conscious of the constant movement of air which we call a draught or wind, because we feel it, but we are utterly unconscious of the movement of air which is occasioned by our walking across a room; and even such delicate organs as our eyes give us no information whatever. Hence it is that no instrument which man has yet devised can indicate to us more than can be observed by the movements of the lightest of substances. Hence also it is that poisonous germs are so dangerous; not that they pervade the whole atmosphere, but because of the incessant motion of air which we only are thoroughly assured of inferentially, and by which the germs may at any moment be brought in contact with our lungs and other organs. The whole subject requires investigation by our ablest philosophers; but, in the absence of the most delicate experiments, it is easy to understand a great deal about the matter. The distinction drawn between radiated and conducted heat appears to me to be hardly worth consideration. An open fire is valuable from its cheerfulness and the change of air it occasions. This is the only distinction I can draw between that system of warming and the system of warming by stoves or hot-water pipes. We depend both on radiation and conduction in all the appliances in use.

FREDK. EDWARDS, JUN.

CAUTION.

SIR,—I desire to warn architects against a person who is going about seeking help under the plea of obtaining employment. He told me a most pitiful tale, and, believing him, I gave him money. Feeling desirous of helping him still further, I made inquiries respecting him from eminent London architects (whose names he freely used) only to learn that he was an impostor.

PROVINCIAL ARCHITECT.

Appointments.—At a monthly meeting of the Town Council, held on the 8th inst., Mr. F. A. Kemp was appointed assistant borough surveyor of Sheffield, and Mr. T. Tinker was appointed junior assistant.

* We mentioned and commented on these not very long ago.—ED.

HOW THEY MANAGE THINGS AT BILSTON.

AT the last meeting of the Bilston Township Commissioners and Local Board of Health, held on the 15th inst., a letter was read from the Local Government Board asking for information as to the prevalence of zymotic diseases in the town, and it is to be regretted that the Board, instead of replying to the central authority in a straightforward and dignified manner, instructed the clerk to write and refer them to the late medical officer. The population of Bilston is 25,000, and they pay their medical officer 20*l.* a year!—a salary which the London Board has refused to sanction. As a resident in Bilston, I cannot but feel humiliated at the conduct of our local Parliament in proceeding in such a manner.

They have reports both from the late medical officer of health and the surveyor setting forth the unsanitary condition of several parts of the district, and there are several houses in the following streets whose cellars are contaminated with sewage, viz., Queen-street and Bilston-street, Bradley; John-street, Tame-street, and Caledonia street, Bilston; and John-street and Pump-street, New Village; all of which districts are under the sanitary, or, rather, unsanitary, control of the commissioners, who, I believe, desire to do their duty, but are not sufficiently educated to understand the increasing importance of sanitary administration.

Now, the sewers in the streets referred to above are literally full with black, stinking, sewage matter. There are plans in the surveyor's office, prepared by that official, showing how this state of things can be remedied. The medical officer and surveyor have called the attention of the Board to it, yet there is nothing being done! How do they excuse themselves from executing the necessary structural works? "We have not much money, and the people living in those streets do not complain." Unfortunately, the people who are in a good social position at Bilston take very little interest in its government, and they regard membership of the Board derogatory; and, however much this is to be regretted, the natural consequence is that the class of people who compose the Board is not, as a rule, what is to be desired.

Probably such a high standing paper as the *Builder* will not be read by any member of the Bilston Board, but let us hope, for decency's sake, it will be read by some of its more influential residents, and so move them to action on behalf of their benighted town. If the *Builder* were to send one of its staff to test the accuracy of this communication, I should expect to see such a description as I shall,—in the absence of such a report,—hope for in vain. A. F. G.

THE MYSTERIES OF FIGURES.

SIR,—Your correspondent "J. H.," in a letter published on the 11th inst., asked the "whys and wherefores" of a clever arithmetical puzzle, and wished to know if there were any "deep signification" in the occurrence of the numeral 9.

"H. L.," in the *Builder* of the 18th inst., gives an algebraical explanation in the case where the number is one of eight digits, and Mr. J. G. Vine, in the first part of his letter, gives a general demonstration. This seems very satisfactory, but for his slip in writing n instead of $n-1$ as the exponent of r in the last term of his equations.

With regard to the occurrence of the numeral 9, both in this puzzle and in the case demonstrated in the second part of Mr. Vine's letter, it will be found that this occurs because 9 is one less than 10, the radix of our common notation. If we try 9 as a radix, we find the numeral 8 possessed of the qualities the 9 now enjoys; and a similar case occurs with any other number as radix. DELTA.

MULTIPLY 9 by itself, or by any other of the digits, and the figures of the product added together amount to 9. The component figures of the amount of the multiplier (viz., 45) when added together make 9.

The amount of the several products or multiples of 9 (viz., 405) when divided by 9 gives a quotient of 45, and the component figures of either the dividend or quotient added together make 9.

Multiply any row of figures either by 9 or by any one of the products of 9 multiplied by

one of the digits, as by 18, 27, 36, 45, 54, 63, 72, or 81, and the sum of the figures of the product added together will be divisible by 9.

Multiply the nine digits in the following order:—1, 2, 3, 4, 5, 6, 7, 8, 9, by 9, or by any one of the products of 9 mentioned in the last paragraph, and the product will come out all in one figure, except the place of tens, which will be a 0, and that figure will be the one which multiplied into 9 supplies the multiplier; that is, if you select 9 as the multiplier, the product will be (except the place of tens) all ones; if you select 18, all twos; if 27, all threes; and so on. Omit the 8 in the multiplicand and the 0 will also vanish from the product, leaving it all ones, twos, threes, &c., as the case may be.

A. B.

COMPETITIONS.

CROYDON BOARD SCHOOLS.

THE School Board for Croydon recently invited plans, in limited competition, for a new school in the Sydenham-road, and from the ten designs submitted, that by Mr. Charles Bell, of Dashwood House, New Broad-street, has been selected for execution. The new schools will accommodate 750 children, at a cost of about 5,400*l.*

LIVERPOOL SCHOOL OF ART.

SIR,—In reply to what has appeared in the *Builder* respecting the Liverpool School of Art Competition, I shall be glad to state the following facts:—

1. The Committee of Selection consisted of ten members, several of whom have considerable knowledge of plans and elevations, and all of whom had previous experience of building competitions.

2. No competitor was informed by me that the directors would appoint a professional referee. To such as asked the question, I handed the enclosed copy of the resolution adopted by the Board.* To those asking personally for information, I gave what I could, without stint; but always with an understanding that my opinion was but an opinion, and not an "instruction."

3. The competitor who was once a member of the Board took every care to keep his identity unknown. His design was not included in the final selection.

4. I know of only *one* effort at "touting," and that was nipped in the bud, the design sent in being rejected at an early stage.

5. Until the moment after the awards had been made, not a member of the Selecting Committee was aware of the identity of any of the authors of the designs.

The appointment of a professional referee, and the exhibition of the designs, are matters upon which the Board had a perfect right to form their own conclusion; and the competitors an equal right to differ from them thereon. That difference they are freely expressing.

To such as care to place faith in the assurance of one who has equal interest in the Committee and the Competitors, I can only say what I have before stated, that the award of premiums has, in every sense, been justly and fairly conducted; and that every step of the careful inspection which led up to the final selection has been taken without prejudice to a single person concerned.

CHARLES SHARP, Secretary.

"SANITARY SCIENCE IN ITS RELATION TO CIVIL ARCHITECTURE."

SIR,—As you were good enough to print some remarks of mine on small-bore drains in the *Builder*, p. 514, *ante* (Oct. 23), and which remarks were supported by Mr. Buchan in the same journal (Nov. 13), I make bold to trouble you again on a very important question raised by "A.R.I.B.A.," in your issue of the 11th inst.

Before I proceed to give an opinion as to many of the scientific dogmas with which some of our *dilettanti* seem exceedingly fond of surrounding sanitary matters, I would like to tell "A.R.I.B.A." that his ⊐-trap, which has bothered him, is not a trap at all. The 10 ft. vertical lead pipe is on many occasions the long leg of a syphon, and draws the water from the trap, leaving no water seal there at all. I say on many occasions; for if only small quantities of water are thrown into the sink, the syphon is not forced into activity, there being air-space in the waste-pipe; or, in other words, the water does not descend at full bore. The very fact of it being a well-made trap and a sound piece of work is an argument in favour of its being a good syphon. Not only ⊐-traps, but S-traps, performing these same antics, have come under my notice, and I have no hesitation in declaring that hundreds of traps are fixed, and nobody ever gives the slightest thought as to their functional performances, or whether they have a water seal or not.

Let any one who wishes to see what can be done in that way simply dash a pail of water into a common pan-closet, which has a vertical soil-pipe, and then note carefully how much water-seal there is. He will find, as I have found, that the descending water has actually sucked away the very efficiency of the trap. Further, he will find that if this experiment is made on the ground-floor or first-floor, traps on every floor above which are connected to the same soil-pipe,—unless the soil-pipe is carried up into the open air,—will be more or less affected in proportion as the work has been well done or the contrary. I have gone into houses where the inmates have over and over again complained of the presence of the drains, torn down good work, but with no effect, until I accidentally discovered the offending cause: so I can quite sympathise with "A. R. I. B. A." in this case. Another cause of unwholesomeness about sinks is the damp, and that also may have something to do with making that particular room "*noisome*." With regard to trapping sink-wastes, I would trap the end of every waste-pipe, and the branch of every soil-pipe which should or may pass within the walls of any domicile, and also see that they were efficient ones too. The difference between the old-fashioned open drain and the modern ventilated one seems to me to depend on the swifter removal of the latter in contradistinction to the sluggishness of the former, and in this difference must lie the success of the new idea; for, if it merely depended on the abundant supply of air into close drains, the sooner we get back to open drains with plenty of fall the better.

Ventilation of drains is a very dangerous business, and instead of being a safety-valve, may indeed be a conductor of sewer gas (or sewer "air," if it be more fashionable) into our very sleeping-rooms.

For example, a fire is lighted in a bed-room. A person may possibly be lying there sick; a door is opened into an adjoining room, where there is an open fireplace, but no fire. Most assuredly the air which may happen at the moment to be around that chimney-top, where there is no fire, will descend that flue and enter the room where the fire is; and just as likely as not, a ventilator from some drain would be close to it, and the rest is easily divined. Let us imagine what kind of an atmosphere is going to be created over our heads when thousands of so-called ventilators or extractors are night and day belching forth their destroying effluvium, and saturating it with pestilential vapours. No, the last word is not said upon these things, and the *Builder*, opening its columns to a discussion of such matters, is undoubtedly conferring a real good not only on sanitarians, but on the world at large. I believe there may be sewer air, but I also believe there is sewer gas, or, at any rate, a compound which is generated in no other laboratory on earth excepting in a sewer. Anybody knows, who has to do with gas mains, that, in almost every one there is a per centage of leakage. In various ways part of this gets into sewers, and then, sweltering there in contact with sewage, becomes mixed with other vapours producing what is, no doubt, as good a name as we can give it,—sewer gas.

I do not wish to be understood as objecting to ventilation of drains, but I do contend it ought not to be carried out in the haphazard manner which is at this time being practised in many parts of London. We have something more to learn yet, and some results of this reckless jumping at pet theories may give us a startling surprise some of these days.

PRACTICAL SANITARIAN.

* "I am requested by the directors to inform you that while they do not bind themselves to appoint a professional referee, they think it probable that they will avail themselves of his advice in coming to a decision upon the designs sent in."

STATUES.

The late Prince Consort.—The statue of the late Prince Consort which has been presented by Mrs. Richardson-Gardner to the Windsor Albert Institute, and placed in a niche in the façade of the building facing Sheet-street, has been unveiled by H.R.H. Princess Christian. The Prince is represented in a standing position, and attired in the robes of a Knight of the Garter.

Lord Lawrence.—The executive committee of the Lawrence Memorial, at a meeting held last week, adopted the principle of the design submitted by Mr. Boehm, who, to indicate Lord Lawrence's character, has seized on an incident related of his earlier career in the Punjab. He exhibits a sword and a pen to the Sikh chieftains, and demands to know by which they choose to be governed. Mr. Boehm will now proceed with the work. The statue is to be placed in the south-east corner of Waterloo-place, opposite that of Sir John Burgoyne.

Books.

The Sculptor Caught Napping; a Book for the Children's Hour. Designs by JANE E. COOK. The Autotype Fine Art Company, 531, Oxford-street.

THIS is a second edition, much elaborated, of a set of designs originally published to aid the fund for enlarging the buildings of King Alfred's School, Wantage, Mrs. Cook, the very clever author of them, being the wife of the principal of that school. The nursery rhymes, before in cameo, are given again, but are supplemented by a series of one dozen extra designs treated in the genuine silhouette style, but with the artistic touch and exquisitely graceful design peculiar to her original fancy and fertility of quaintly humorous design. The silhouettes carry on the story told in cameo, and the combination of the two is a happy way of showing the differences of the two processes, the former being, so far as we know, a novelty. Of the artistic ability of Mrs. Cook, who is the sister of a well-known architect, we have before had occasion to speak warmly. We cordially recommend her new book.

VARIORUM.

"THE Architect's Legal Handbook," by Edward Jenkins and John Raymond, barristers-at-Law (C. Kegan Paul & Co.), has reached a third edition, and has been enlarged and improved. Full reports of several important cases are given in an appendix, and the Metropolitan Building Act Amendment Act, 1878, and the Bye-laws made under it, are added. A large number of our readers will find the book indispensable.——"Engine-driving Life," by Michael Reynolds (Crosby Lockwood & Co., 1881), gives stirring adventures and incidents in the lives of locomotive-engine drivers. It is pleasant reading and, moreover, calculated to give the public an insight into struggles and labours of which they know little or nothing, and induce sympathy for a deserving set of men.——Amongst the many "Christmas numbers" announced must be included, as of a somewhat interesting nature, that of the *Gardener's Magazine*. A profusion of pictures is, of course, to be expected, but the peculiar features of these special issues are the papers on plant history.——The "Railway Almanack" for 1881 contains, besides the calendar, an official list of the chairmen and executive officers of the independent lines of railway in the United Kingdom, and the dividends paid for the four previous half-years.

Miscellanea.

The Birmingham Art Gallery and Museum.—It is announced that the fund for providing works of art for exhibition in these proposed buildings has already reached the sum of 6,542*l.* 9*s.* In an appeal which the Mayor, who is treasurer, and Mr. Allen Edwards, the secretary to the fund, publish in the Birmingham papers, they state incidentally that the building of the gallery will probably occupy three years. They point out to local manufacturers how closely the prosperity of the town is associated with the knowledge and practice of art by those who are engaged in many of its staple trades. Already the ground for the proposed building is being cleared for the commencement of the works, and the plans are rapidly approaching completion in the office of Mr. Yeoville Thomason, architect. It is designed that the Art Gallery shall be built fronting upon Congreve-street and Edmund-street, and that the basement-floor shall be occupied by the offices of the Gas Department of the Corporation. The plans, so far as they are at present elaborated, include a handsome entrance vestibule, capable of being used for sculpture, of the dimensions of 57 ft. by 18 ft.; two picture-galleries, each about 60 ft. by 28 ft.; a magnificent hall for the display of objects of industrial art, 129 ft. by 53 ft., with light galleries on both sides; another room for pictures measuring 53 ft. by 26 ft.; and a principal picture-gallery, 80 ft. by 53 ft.,—all arranged in a way to facilitate the inspection of the contents of the rooms by visitors.

Æsthetics in Scotch Schools.—The *Inverness Advertiser* reports that, on the 11th inst., a meeting of the "Æsthetic Committee" of the Inverness and Ross Educational Institute was held in Farraline Institution. Mr. Jolly, H.M. Inspector of Schools, presided, and gave a short address, indicating the nature of the work proposed to be carried out by the committee, and asking that any of the teachers who had anything to report, by way of showing what had already been done, might kindly furnish him with some facts thereanent. He intended, he said, shortly to lecture at Arbroath as to the æsthetic adornment of schools, and a few tangible illustrations supplied from the Inverness and Ross districts would be very useful. Some conversation followed the address, and Mr. Jolly mentioned that perhaps the most outstanding proof in the Inverness and Ross districts of the good effects of the committee's work was to be seen in the Drumnadrochit School, which had been most tastefully decorated, owing, in great measure, to the heartiness with which the local School Board had entered into the proposals of the committee. Miss Millais, daughter of the celebrated painter, had paid a visit lately to Drumnadrochit, had gone to see the school, and had said that she had never believed a school could be made so tasteful, sweet, and attractive as it was.

Coming Exhibitions at York.—At a recent meeting of the Council of the Fine Art Institution, York, it was agreed that the summer exhibition of 1881 of works of art should be opened at the same time as the Prince of Wales's Indian presents are ready for public inspection. Simultaneously with this exhibition one will also be held of scientific appliances intended to illustrate the progress of science during the last fifty years, and in addition there will be an exhibition of art manufactures and of such mechanical operations as may be found consistent with the space at the disposal of the committee.

A "Society of Chemical Engineers."—A meeting was held on the 14th inst. at Owens College, Manchester, to consider proposals for forming a society of chemical engineers. Mr. G. E. Davies (hon. secretary) read a report which stated that at the last general meeting, in April, it was suggested that a society of chemical engineers should be formed, and that a committee was then appointed to consider that proposal. That committee had held four meetings, one in Liverpool and three in Manchester; and a circular letter had been sent out by its chairman (Professor Roscoe) to persons well known for their attainments in chemical science and chemical industry. The circular contained the following passages:—

"A committee of gentlemen interested in the progress of chemical industry, and resident in this district, has met several times during this year for the purpose of considering the advisability of establishing a society to be called 'The Institute of Chemical Engineers,' or 'The Institute of Chemical Industry.' The proposed society would be a national one, and would seek to bring into contact a large class of persons interested in the very various branches of trade and manufacture which are specially connected with chemical science. Periodical meetings like those of the Mechanical Engineers or of the Iron and steel Institute would be held for promoting scientific, industrial, and social intercourse amongst the members of the society. Possibly the publication of a journal specially devoted to the subject might form part of the scheme."

From the number and nature of the responses made to the circular, the committee advised the formation of a society without delay; and recommended that a small sub-committee should be appointed to make the necessary arrangements for an inaugural meeting in London, to draw up regulations and to take other steps which might conduce to the welfare of the proposed society. The recommendations were agreed to, and Professor Roscoe, Mr. Ludwig Mond, Dr. Campbell Brown, Dr. Hewett, Mr. E. K. Muspratt, Mr. E. Carey, Mr. E. Gossage, and Mr. G. E. Davies, were nominated members of the sub-committee, with power to add to their number. It was resolved that the new body should be called the Society of Chemical Engineers.

Proposed New Park for Hull.—At a meeting of the Town Improvement Committee of the Hull Corporation, held at the Town-hall on the 10th inst., Alderman Waller presiding, Mr. Fryer brought under the notice of the committee the desirability of securing Jalland's Hall and estate, situate in Holderness-road, for the purposes of a public park. The property was, he said, in every way suitable for the purpose, and, seeing that Hull possessed no public park of dimensions such as those at Leeds, Bradford, and other places, he thought this a good opportunity for the Corporation to open negotiations for the purchase of the estate. The new railway and dock would be in close contiguity, and there would consequently be a large increase of house property in that neighbourhood.

Sanitary Condition of Willenhall.—The sanitary authorities of Willenhall have received a communication from the Local Government Board on the exceptional mortality in that township from diarrhœa and scarlatina. As to what the causes of the exceptional prevalence of these diseases are, the *Staffordshire Advertiser* does not hazard any conjecture, but remembers that the brook which flows through Willenhall was a few years since described by the medical officer as an "elongated sewer." It is, moreover, an "open secret" that the greater part of Willenhall is still unsewered. Under such conditions, a clean bill of health is well-nigh an impossibility. The whole subject of underground drainage is, it is satisfactory to learn, under the consideration of the local authorities.

Horse and Cattle Troughs.—It has been asserted that glanders and other diseases amongst horses have of late been on the increase in London, and it is alleged that disease has been communicated to healthy horses through drinking of the water in troughs at which unhealthy animals had previously drunk. At the last meeting of the Metropolitan Board of Works, it was resolved, on the recommendation of the Special Purposes and Sanitary Committee, "That it be suggested to the Metropolitan Drinking Fountain and Cattle Trough Association, and other bodies and persons who provide public drinking-troughs in the metropolis, that such drinking-troughs should be so constructed and used as to have a constant flow of water passing through them and running off, by means of a tumbling bay, direct to a gully; and that measures should be taken to ensure the troughs being thoroughly cleansed every morning."

The Electric Light of Dr. Siemens.—Hydraulic lifts for large hotels and depôts are very costly, and Dr. Werner Siemens is trying to lessen this by the application of electricity to the movement of the cage, according to the *Electrician*. It is as safe as the hydraulic lift, and far less costly and inconvenient. It operates through the transmission of power by the dynamo-electric machine, and the first one was put in operation recently at the Industrial Exhibition of Mannheim, where, during the few weeks it was exhibited, it lifted over 8,000 persons, the speed of the cage or chariot being half a mètre per second. The apparatus consists of a stationary dynamo-electric machine, which is intended to generate the current, and a second or receiving dynamo-electric machine, which is carried in a box below the platform of the lift. The lift is suspended by two wire ropes passing over a drum, and it is counterpoised by a weight, so that the work to be done by the current in raising it is very little compared with the whole weight of the lift. These wires act also as conductors of the current connecting the two machines. They form, in fact, the return wires. The lifting of the carriage is effected by means of a central ladder or rack, with its rungs or teeth very close together, and two toothed wheels connected to the bottom of the carriage gear with this rack. These wheels are driven bp the receiving dynamo machine through the intermediary of an endless screw on the axle of the armature. The sides of the ladder act also as a conductor conveying the current from the generator, and two revolving wheels carried by the frame of the carriage make contact with the sides of the ladder, and tap the current in order to lead it to the coils of the dynamo machine. The lift is started or stopped, raised or lowered, by means of a communicator handle. This is not the first time Dr. Siemens has given a lift to electricity.

Mr. Mechi.—It is generally felt that a case for universal sympathy arises out of the complete collapse of the worldly fortune of Mr. Mechi. The *City Press* gives some particulars of Mr. Mechi's career. In early days renowned for his "magic" razor-strop, and in latter days much more renowned for his scientific farming, the unfortunate gentleman may even yet gain renown of a painful kind as a martyr to high principles and punctilious honour. In the high tide of his civic prosperity as a member of the Court of Aldermen, Mr. Mechi became connected with a bank which, at a critical moment, was found to be unequal to its engagements, and he sacrificed much of his possessions to meet its demands. Speaking generally, his career has been chequered by successes due to spirited enterprise, and disasters resulting from enthusiasm and generosity. It will probably shock public feeling to hear that the ex-sheriff and alderman, when nearing his eightieth year, is actually in want.

The Nelson Coffee-house at Salisbury.—This coffee-house, which has been in course of erection for some time in Fisherton-street, was opened on the 16th inst. by Earl Nelson. The building is well planned, and contains about thirty rooms, including a very large club-room. A lift and a tramway have been made to minimise labour, and ventilating apparatus of a very perfect character has been provided. The exterior is of a deep red tone, almost Pompeiian in its style; full-coloured bricks with dark chocolate pointing have been employed, and the dressings (window-arches, medallions, finials, &c.) are of terra-cotta, supplied by Messrs. Doulton, of Lambeth. The contractor for the whole of the works was Mr. Arthur Foley, of Fisherton, who also provided all the fittings and furniture. Mr. F. Bath, of Crown Chambers, Bridge-street, designed the building, and both architect and builder have received great credit for their work.

Royal Albert Hall.—The Albert Hall Choral Society will give the "Messiah," Monday evening, the 27th inst., with Miss Anna Williams, Madame Patey, Mr. Sims Reeves, Mr. W. H. Cummings, and Mr. Ludwig, under the *bâton* of Mr. Barnby.

Messrs. Jones & Willis have just completed a polished brass lectern for the Rev. Mr. Biggs, Malacca chaplaincy, Straits Settlement; and an oak reredos for St. John the Baptist Chapel, Hulme, Manchester.

The Heat, Light, and Ventilation Exhibition has been postponed for a few weeks, at the request of a number of manufacturers, and will be held from January 26 to February 12, at the Alexandra Palace.

Crystal Palace Company's School of Practical Engineering.—On Saturday last the certificates awarded to the successful students of this school for the winter term were distributed. Mr. Shenton, the secretary of the Crystal Palace School of Art, Science, and Literature, read the report of the examiners (Messrs. W. J. Kingsbury and J. E. Lowe), who stated that they regarded the work done by the students as very creditable, and testified to the success of the system of teaching of the principal, Mr. J. W. Wilson, and of the vice-principal, Mr. J. W. Wilson, jun. Mr. E. A. Cowper, C.E., president of the Institution of Mechanical Engineers, prior to distributing the certificates, spoke of the advantage of the studies at the school. He regretted the objection of some of our manufacturers to entertain any improvements merely on account of temporary inconvenience, and stated that in America it was quite the reverse, new things being there regarded favourably, and in many cases tried and brought to perfection. After speaking of the present attempts of the City Guilds and others to advance technical education, he observed, as to new fields into which their energies might in future be directed, that the manufacture of rolled steel sleepers for railways would probably be a question of the future.

The Builders' and Manufacturers' Exchange and Subscription Rooms.—To provide these premises, Nos. 205-6, High Holborn, have been taken, and will be opened to members on the 1st of January. Particulars of the project will be found in our advertising columns. The object is to provide a convenient and central place of meeting for the conduct of business. It is intended by the proprietors to afford all the facilities offered by such establishments as the Baltic, Lloyds', Commercial Sale Rooms, Corn Exchange, Jerusalem Coffee House, &c., with the additional advantages of separate reading and writing rooms, consultation and smoking rooms, distinct from the "Exchange." An exhibition, moreover, will be opened on the ground-floor, for the display of all manufactures connected with the building trade, the admission to which will be free on presentation of an address or business card.

The Sunday Society announce the opening of the Winter Exhibition of Oil Paintings at the Hanover Gallery, New Bond-street, by permission of the proprietor, Mr. Weil, on Sunday, December 26, and on the two following Sundays.

New Cemetery for Carlisle.—Plans prepared by Messrs. Hetherington & Oliver, of Carlisle, have been adopted by the Burial Board of that city for laying out the new cemetery at Upperby.

TENDERS

For the restoration of the Parish Church, at Grendon near Northampton, for the Building Committee, including new stained-glass window to chancel. Mr. H. M. Townsend, architect. Quantities supplied:—

Ireson, Northampton	£215 0 0
Rands & Son, Wisbech	201 0 0

For the erection of a pair of semi-detached villas, at Bexley, Kent, for Mr. Jas. Carter. Mr. Richard Peters, architect. No quantities:—

Watson & Dennett, Dulwich*	£1,285 0 0

* Accepted.

For additions and alterations to the Vicarage, Lewisham, for the Hon. and Rev. Canon Legge. Messrs. E. & W. H. Nash, architects. Quantities supplied by Messrs. Franklin & Andrews:—

J. & C. Bowyer	£1,829 0 0
Banks	1,683 0 0
Jarrett	1,640 0 0
J. & J. Greenwood	1,631 0 0
Jerrard (accepted)	1,483 0 0

For alterations and additions to the Anglo-Bavarian Brewery, Shepton Mallett, for Messrs. Hill & Garton. Mr. W. H. Clark, architect. Quantities supplied by Mr. A. Deane:—

	Contract No. 1. £ s. d.	Contract No. 2. £ s. d.	Contract No. 3. £ s. d.
Davis	2,990 0 0	350 0 0	285 0 0
Humphreys	2,892 10 0	383 6 0	310 0 0
Lewis & Edbrooke	2,873 0 0	386 10 0	346 0 0
Stephens & Bastow	2,899 0 0	349 0 0	319 0 0
Forse & Ashley	2,846 16 0	365 5 0	350 0 0
Church	2,775 0 0	367 0 0	320 0 0
Ashman	2,790 0 0	305 0 0	275 0 0
Beaven	2,790 0 0	296 0 0	298 0 0
Veals	2,794 0 0	289 0 0	314 0 0
Gay	2,700 0 0	281 0 0	385 0 0
J. & S. Emery	2,479 1 4	301 12 6	276 12 2
E. & J. Hatherley	2,387 0 0	353 7 6	227 0 0
Pullen*	2,394 18 0	307 15 6	207 16 7
R. J. Croker†	2,219 10 0	296 0 0	335 0 0

Girders, Rolled Joists, and other Ironwork.

A. D. Dawnay, London (accepted)	£619 0 0

* Accepted for No. 3.
† Accepted for Nos. 1 and 2, subject to No. 2 being cut down.

For fittings for Vegetarian Restaurant, Market-place, Manchester, for Mr. F. Smallman. Mr. T. Hartar, architect. Quantities by Mr. L. Campbell:—

Contract No. 1.—*Partitions and Fixtures.*

Wood	£530	0	0
Brown	517	0	0
Hibbert	498	10	0
McFarlan	487	0	0
Napier	485	0	0
Maben & Fairnington (accepted)	440	0	0

Contract No. 2.—*Seating and Mirrors.*

Gaddes	£341	0	0
Brown	339	0	0
Wood	323	0	0
Todd	318	0	0
Hibbert	260	0	0
Maben & Fairnington (accepted)	250	0	0
Napier	228	0	0

For the erection of Glebe Farm at Kingsthorpe, near Northampton, for the Rev. J. H. Glover. Mr. G. T. Vickers, architect. Quantities supplied:—

Tew & Baldwin	£1,464	0	0
Shakeshaft	1,253	0	0
Mason	1,220	0	0
Heath	1,177	0	0
Wadham	1,110	0	0
Underwood	1,025	0	0
Ireson	998	0	0
Wareing	990	0	0
Stageman	964	0	0
Benges	965	0	0
Woodford & Son	965	0	0
Wingrove	936	0	0
White	907	0	0
Basford	897	0	0
Fisher Bros.	891	0	0
Clayton & Sharman (accepted)	881	0	0

For the erection of the Lycett Memorial Chapel, schools, and class-rooms, Mile-end-road. Mr. Charles Bell, architect. Quantities by Mr. Henry Lovegrove:—

Jones	£6,765	0	0
Bowyer	6,680	0	0
Holloway	6,440	0	0
Toms	6,440	0	0
Staines & Sons	6,386	0	0
F. F. Wood	6,253	0	0
Smith & Son	6,096	0	0
D. T. Wood	5,999	0	0
Stephens & Bastow	5,999	0	0
Nightingale	5,981	0	0
F. Higgs	5,974	0	0
Hobson	5,974	0	0
Julian & Co.	5,700	0	0
Charlwood	5,785	0	0
White	5,779	0	0
Judd	5,698	0	0
Castle	5,690	0	0
Johnston	5,493	0	0
Harris & Wardroper	5,456	0	0
Drake	5,297	0	0
Gregar (accepted)	5,200	0	0

For Gloucestershire (2nd) County Lunatic Asylum. Messrs. John Giles & Gough, architects. Quantities supplied by Mr. C. H. Goode:—

King, Gloucester	£27,000	0	0
Groome, London	25,800	0	0
Garlick, Birmingham	25,555	0	0
Trevena, Plymouth	24,350	0	0
Lissaman, Leamington	24,142	0	0
Howell & Son, Bristol	24,000	0	0
Rigby, Worksop	23,962	2	10
Welsh, Hereford	23,950	0	0
Thomas, Pembroke	23,341	0	0
Vernon & Ewens, Cheltenham	23,229	0	0
Meredith, Gloucester	23,057	0	0
Jones & Co., Gloucester	22,950	0	0
Brock & Bruce, Bristol	22,700	0	0
Krauss, Bristol	22,689	0	0
Ashbee & Sons, Gloucester	22,500	0	0
Clutterbuck, Gloucester	22,500	0	0
Smith, Birmingham	22,478	0	0
Neill & Son, Manchester	22,360	0	0
Cousins, Cardiff	22,350	0	0
Appleby & Lawton, Milford Haven	22,200	0	0
Lovatt, Wolverhampton	22,137	0	0
S. & W. Pattinson, Sleaford	21,990	0	0
Drew, Chalford	21,519	0	0
Church, Bristol	21,474	0	0
Forse & Ashley, Bristol	21,927	0	0
Veals, Bristol	20,900	0	0
Sharman, London	21,580	0	0

For new building in Little Park-street, Westminster. Mr. Henry S. Legg (Christ's Hospital), architect:—

	Portland Stone.	Less if in Bath Stone.
Longmire & Burge	£2,530	£120
Kirk & Randall	2,461	101
Patman & Co.	2,439	80
Macey & Son	2,350	100
Outhwaite	2,265	121
Morter	2,183	82
Nightingale	2,162	78

For works at Central-street, Goswell-street, St. Luke's. Mr. W. Smith, architect:—

Lester	£615	0	0
Oliver	495	0	0
Larke	470	0	0
Jones	460	0	0
Shurmur	454	0	0
Harper	449	0	0
Grover	419	0	0
Huckett	357	0	0

For fire-engine house and cottage, &c., for the Sevenoaks Local Board. Mr. Geo. W. Brumell, architect. Quantities by Mr. Thos. Potter:—

Bowyer	£684	0	0
Balaam Bros.	675	0	0
Hodges	665	0	0
Beale	647	10	0
Morris	630	0	0
Wiltshire	625	0	0
Seal	620	0	0
Durtnall	615	0	0
Julian & Co.	610	0	0
Warr	583	0	0
Higgs	576	0	0
Timewell	570	14	0
Willicombe & Oakley (accepted)	565	0	0
Owen	496	0	0

TO CORRESPONDENTS.

E. L. T. (the matter needs further consideration. Builders have, before now, recovered, under certain circumstances, the cost of preparing an estimate)—"Can a Builder Charge for an Estimate" (several letters on this subject shall have consideration).—De Sautrailles ("necessary extras omitted in the specifications through the neglect of the architect" could *not* "be deducted from the architect's commission." A different course must be pursued if the charge be correct).—H. H. G.—T.—S. P.—J. S.—M. & L.—E. E.—R. P.—E. C. S.—E. P.—W. L.—H. L.—T. H.—W. C. B.—J. T. B.—J. W. W.—J. S.—W. S.—C. W.—S. N.—W. B.—W. D. D.—W. S. & Son.—G. S.—H. & K.—L.—W. B. P.—E. F.—F. B.—P. P.—J. S. H.—H. S. L.—H. & O.—J. D.—D. P.—E. A. H.—C. B.—B. I.—R. F. H.—Dr. P.—N. (no).—S. P. C. (next week).—A pile of letters too late for present week.

All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

Note.—The responsibility of signed articles, and papers read at public meetings, rests, of course with the authors.

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